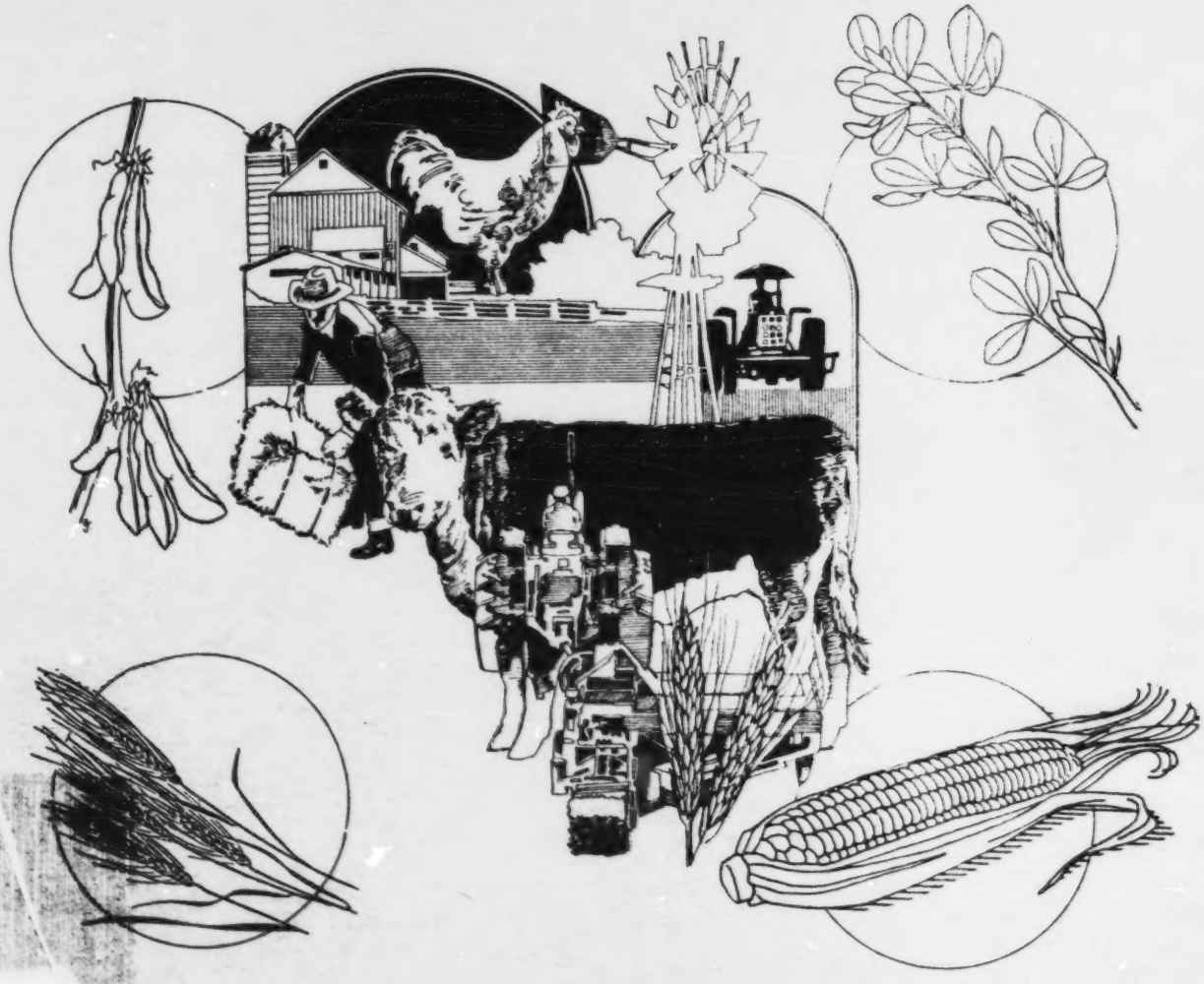
Nova Scotia
Department of
Agriculture and Marketing

Soils and Crops

Project Results 1987



Soil & Crop Improvement Associations

A C K N O W L E D G E M E N T S

The technical support of Charles Surette and Alden Knight and the efforts of Summer Assistants Janine Thomson, Karen Burgher, Jennifer Gilmore, April Ingraham, Lisa Taylor and Abra Haliburton.

The contribution of the following companies to various projects are acknowledged:

BASF	Minas Seed Co-op
Bishop Seeds	Union Carbide
Chemagro Ltd.	W.A. Flemming
Ciba Geigy	Pioneer
Co-op Atlantic	Niagara Chemicals
SDS Biotech	Uniroyal Chemical
King Agro Ltd.	Thompsons Seed

INDEX

Forages

Perennial Ryegrass Screening Trials..... 1
Timothy Cultivar Quality Study..... 4
Hay Desiccant Trial 1987..... 6
1987 Fodder Beet Variety Evaluation Trial..... 12
East Hants Forage Variety Demonstration Trial, Est. 1986..... 13
1987 Stubble Turnip Trial..... 17
Provincial Forage Demonstration Site: Lower Canard Est. 1985..... 18
West Hants Pasture Trial..... 20
Annual Forage Trial..... 22
Evaluation of a Direct Cut-Formic Acid Treated Grass Silage for Finishing Beef Calves..... 26
Lunenburg Co. Soil & Crop Improvement Association Forage Demonstration Site..... 29

Cereals

Winter Wheat Rate of Seeding Trial..... 30
Spring Wheat and Triticale Production Management Trial..... 31
Spring Cereal Rate of Seeding Trial..... 33
Barley Production Management Trial..... 37
Spring Wheat Disease Control..... 41
Six Row Barley Management Trial II..... 43
Spring Wheat Rate of Seeding & Row Spacing..... 44
Spring Grain Seed Treatment Trial..... 45
Miscellaneous Grain Demonstration Trials-Western Region..... 47
Annapolis County Cereal Competition..... 48
Soil and Crop Association Competitions Western Region..... 51
Max Spring Wheat Survey..... 56
SCIA Cereal Variety Demonstration..... 58
On Farm Barley Management Demonstrations..... 60
On Farm Canola Projects 1987..... 65
Canola Production & Yield Trials 1987..... 66
Sulfur Fertilization of Canola..... 67

Corn

Pioneer Corn Hybrid Demonstration (H.M.E.C.)..... 69
Digby Co. Soil & Crop Improvement Association 1987 Field Crop Trial Summary..... 71
High Moisture Earcorn Hybrid Trial..... 73

Other Crops & Trials

Tye No-Till Seeder Trial..... 74
Mower-Conditioner Performance Analysis..... 75
Newly Initiated A.L.F.I. Technology Transfer Projects..... 79
Small Diameter, Close Spaced Tile Drainage Evaluation..... 85
Tansy Ragwort Control in Grass Pastures..... 86
Preplant Control of Smooth Bedstraw..... 88

NOVA SCOTIA
LEGISLATIVE LIBRARY

PROVINCE HOUSE

PERENNIAL RYEGRASS SCREENING TRIALS

Bill Thomas, Provincial Forage Specialist

There are currently three test sites for the evaluation of perennial ryegrass in Nova Scotia. Screening trials were established to evaluate the yield, winterhardiness and resistance to crown rust of several cultivars from Northern Europe that are stated to have superior winterhardiness. It is hoped that at least one of the cultivars under test will prove to be superior to Norlea, the only perennial ryegrass currently recommended in Nova Scotia.

In order to test cultivar performance over a wide range of environmental conditions, the three trials were established on different soil types, within particular climatic zones.

All cultivars at all sites overwintered with little or no winter injury. The plots were harvested three times at Truro and Hardwoodlands, but only twice at Canard due to reduced vigor caused by drought.

Observational data on rust resistance was collected at all sites. There are some very distinct differences in varietal resistance to crown rust. At all sites Norlea, the current recommended cultivar, displayed the most symptoms.

Some cultivars are showing promise as possible future "recommended varieties" for this region.

Perennial Ryegrass Screening Trial

Location:	Hardwoodlands, Hants County, Nova Scotia
Soil:	Queens Series - Fine Loam, Poorly Drained
Experimental Design:	Randomized Block
No. of Replicates:	4
Plot Size:	1.5m X 5m
Fertilization:	April 10 - 34-0-0, 250 kg/ha June 26 - 18-6-18, 250 kg/ha Sept. 1 - 18-6-18, 400 kg/ha

Dry Matter Yield kg/ha

Cultivar	Cut 1 June 17	Cut 2 Aug 12	Cut 3 Oct. 14	Total
Riikka	3298 ab	1324 abc	1889 a	6511 a
Norlea	3686 a	973 c	1743 a	6402 a
Svea	2909 bc	1262 abc	2170 a	6341 a
Valinge	3436 ab	990 c	1711 a	6138 ab
Gunne	2497 cd	1168 abc	2315 a	5980 abc
Fantoom (T)	1617 efg	1475 a	2509 a	5600 abcd
Barnasso	2448 cd	1200 abc	1840 a	5488 abcd
DP1-6	1644 efg	1398 a	2353 a	5396 abcd
Preference	1561 efg	1387 ab	2247 a	5195 abcd
Lamora	2051 de	1252 abc	1868 a	5171 abcd
Bardetta	1681 ef	1491 a	1761 a	4933 bcd
Wendy	1053 gh	1415 a	2151 a	4619 cd
Hella	1423 fgh	1030 bc	1981 a	4434 d
Parcour	868 gh	1394 ab	1956 a	4218 d
Baranna	1192 fgh	1183 abc	1834 a	4208 d

Duncan's Multiple Range Test (P=0.05), two means followed by the same letter are not significantly different.

Perennial Ryegrass Screening Trial

Location:	Lower Canard, Kings County, Nova Scotia
Soil:	Truro Series - fine sandy loam, very well drained
Plot Size:	1.5 m X 5 m
Experimental Design:	Randomized Block
No. of Replicates:	4
Established:	1985
Fertilization:	April 10, 34-0-0, 250 kg/ha June 26, 18-6-18, 250 kg/ha

Cultivar	Puccinia Coronata #1 Best	Dry Matter Yield kg/ha Cut 1 June 12	Cut 2 July 27	Cut 3 Oct. 23	Total
Hella	2.8	5673 a	723 bcd	530 cdefg	6926 a
Gambit (T)	2.0	5628 ab	724 bcd	520 cdefg	6872 a
Bastion (T)	2.5	5514 abc	654 bcd	575 cdef	6742 ab
Gunne	4.8	5001 abcde	910 abc	674 abcd	6585 ab
Svea	3.3	5262 abcd	768 bcd	513 cdefg	6544 ab
Norlea	7.3	5314 abcd	794 bcd	346 g	6455 abc
Valinge	5.8	4993 abcde	782 bcd	549 cdefg	6324 abcd
Riikka	6.0	4930 abcde	861 abc	433 efg	6225 abcd
Fantoom (T)	2.3	4557 def	964 ab	586 cdef	6107 abcde
Ensilo	3.3	4736 cdef	526 cd	434 efg	5695 bcdef
Premo	2.8	4309 bcdef	416 d	418 fg	5642 bcdefg
Meltra (T)	1.8	4240 efg	786 bcd	607 bcdef	5633 bcdefg
Barlet	3.8	3714 ghi	781 bcd	825 ab	5319 cdefg
Barlano	3.8	4088 fgh	669 bcd	487 cdefg	5244 defgh
Magella	3.3	3195 ijk	1187 a	859 a	5241 defgh
Belfort (T)	1.8	3397 hijk	1026 ab	808 ab	5231 defgh
Condesa (T)	2.25	3417 hij	901 abc	690 abcd	5008 efghi
Preference	3.0	3327 hijk	925 ab	647 bcde	4899 fghi
Antrim	3.0	2987 ijk	1019 ab	707 abc	4713 fghi
Parcour	3.3	3067 ijk	953 ab	635 bcdef	4655 fghi
Contender	3.0	2926 ijk	953 ab	619 bcdef	4497 ghi
Vigor	3.3	2641 jk	835 abc	620 bcdef	4096 hi
Rathlin	3.5	2547 k	913 abc	620 bcdef	4081 i
Lamora	3.8	2705 jk	738 bcd	557 cdefg	3999 i
Wendy	4.0	2636 jk	866 abc	468 defg	3970 i

Duncan's Multiple Range Test (P=0.05), two means followed by the same letter are not significantly different.

Perennial Ryegrass Screening Trial

Location:	Truro, Nova Scotia
Soil Type:	Pugwash Series - coarse loam, well drained
Plot Size:	1.5m X 5m
Experimental Design:	Randomized Block
Established:	1986
No. of Replicates:	3
Fertilization:	April 7, 34-0-0, 250 kg/ha June 24, 18-6-18, 250 kg/ha

		Dry Matter Yield kg/ha			
Cultivar	Puccinia Coronata #1 Best	Cut 1 June 19	Cut 2 Aug 13	Cut 3 Oct. 13	Total
Riikka	5.6	7046 a	1355	1355 bcd	8948 a
Hella	4.0	6998 ab	1059	1059 de	8621 ab
Svea	4.6	6721 ab	1151	1151 bcde	8498 abc
Gunne	7.4	6645 ab	1062	1062 de	8174 abcd
Norlea	10.0	6567 ab	1039	1039 de	8126 abcd
Valinge	6.6	6112 abc	1216	1216 bcde	7889 abcde
DPI-6P	5.4	5776 abcd	1042	1042 de	7299 abcdef
Barnasso	4.0	5707 abcd	974	974 e	6917 abcdefg
Citadel (T)	2.6	5115 bcde	1237	1237 bcde	6749 abcdefgh
Preference	5.4	5125 bcde	1127	1127 cde	6685 abcdefgh
Chantal	2.4	4336 cdef	1449	1449 abc	6516 bcdefgh
Fantoom (T)	2.0	3960 def	1757	1758 a	6275 cdefgh
Meltra (T)	2.4	4559 cdef	1283	1283 bcde	6273 cdefgh
Peramo	4.6	4555 cdef	1106	1106 cde	6133 defgh
Condesa (T)	4.0	4079 def	1507	1507 ab	6044 defgh
Barlet	4.6	4036 def	1347	1347 bcd	5975 defgh
Parcour	4.6	4034 def	1182	1182 bcde	5715 efgh
Wendy	5.4	3695 ef	1166	1166 bcde	5410 fgh
Morenne	3.0	3529 ef	1181	1181 bcde	5180 fgh
Bow 1	2.6	3227 ef	1355	1354 bcd	5129 fgh
Salem	4.6	3503 ef	1127	1127 cde	5098 fgh
Contender	4.6	3099 f	1308	1308 bcde	5002 fgh
Lamora	6.0	3062 f	1154	1154 bcde	4776 gh
Vigor	4.6	2705 f	1291	1291 bcde	4426 h

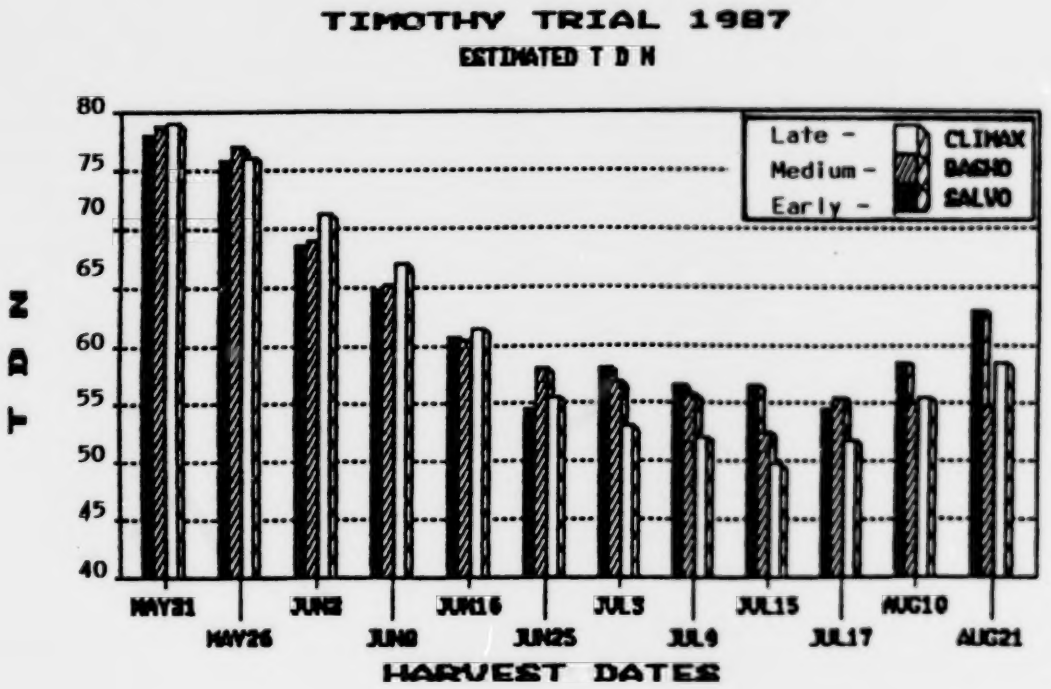
Duncan's Multiple Range Test (P=0.05), two means followed by the same letter are not significantly different.

TIMOTHY CULTIVAR QUALITY STUDY

Bill Thomas, Provincial Forage Specialist

Three timothy varieties with varying maturities; Salvo (early), Basho (mid-season) and Climax (late season), were harvested at 5 day intervals in order to plot and compare forage quality over time.

Of all known conditions the time at which a forage is harvested has the most pronounced effect upon its energy value. Very early in the spring timothy has a T.D.N. value that exceeds eighty percent. This value declines at a steady rate of 0.57 percentage units per day until a plateau is reached at approximately 50% (the point at which the seed head has fully emerged from the boot).

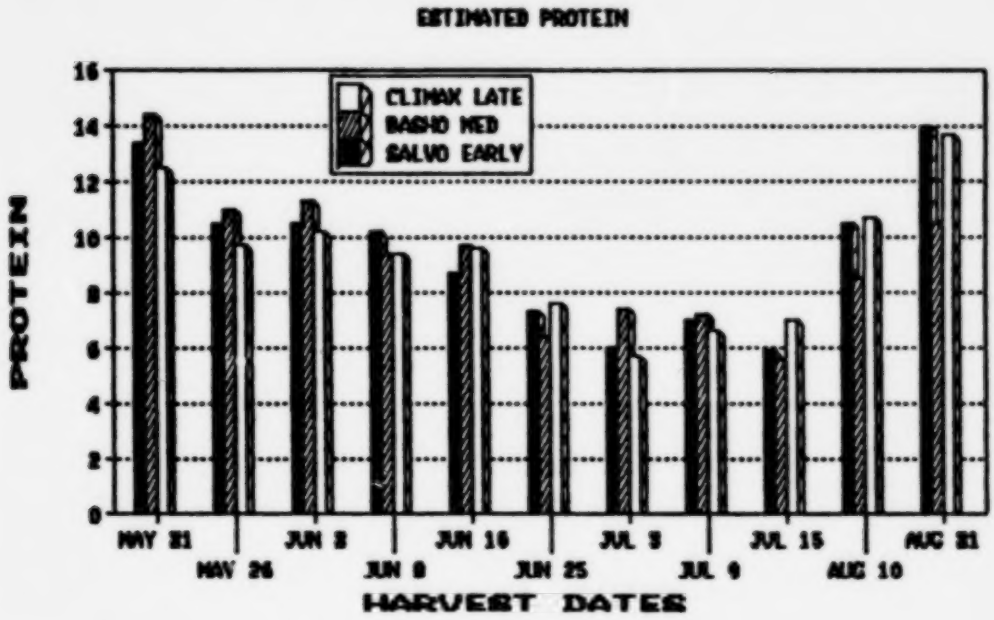


The data depicted in the graph clearly shows that the three timothies declined in energy value at the same rate. It is interesting to note that though the three timothy cultivars vary in maturity, they contained very nearly the same energy values from early May until late June. Several studies have shown that date of cut has a greater effect on the energy value of a first cut forage than growth stage. Work done in the 1950's, looking at the quality of cultivars having considerably different flowering dates, revealed no differences in energy values when harvested at the same time.

In late June the second growth began to develop in the earliest cultivar Salvo, increasing its' energy value. New growth begins to develop when the seed head of the first growth has emerged from the boot. This development is later for the later cultivars and therefore their energy value is lower until mid July.

Nevertheless, as seen in this study, late maturing timothy cultivars often contain "slightly" higher feed energy values when cut at the same date as early flowering timothies. More important than the higher digestibility, is the greater acceptability of later maturing cultivars. Research has shown that livestock prefer a later maturing timothy cut at the same date as a earlier maturing cultivar.

The graph below depicts the percentage of protein over time for the same three timothy cultivars. The pattern of decline and increase is similar to the energy graph. Note that the protein levels are higher in the second cut than the first cut.



The best time to harvest timothy for high yield and top quality is when the head is just starting to emerge from the boot. Plant a range of maturities so that the harvest periods can be spread out while maintaining optimum quality.

HAY DESICCANT TRIAL 1987

Bill Thomas, Provincial Forage Specialist

Introduction

Hay drying agents are chemical hay conditioners applied at the time of cutting to enhance the natural field drying rate of hay.

Plants are covered with a waxy substance called cutin. This layer prevents loss of water from plant tissue. Drying agents disarranges the cutin layer and allows moisture to move out of the stem at near the same rate as the leaf. The result is a marked reduction in field drying time and leaf shatter. Drying agents are only effective on legume hays, particularly alfalfa.

It must be remembered that a drying agent does not dry the crop. It is the wind and sun which does the drying. A drying agent only "helps" faster drying by allowing the water within the stems to escape easier. When drying conditions are poor the effectiveness of the product is greatly reduced.

It has also been observed that hay drying agents have a preservative quality. The alkaline properties of the dry agents are anti-microbial and therefore seem to be able to prevent excessive heating in hay bales stored at higher moisture.

The following trial was conducted at the request of the Antigonish Soil and Crop Association on the farm of Mr. Cornelius Van Den Heuval. Mr. Van Den Heuval's co-operation was very much appreciated.

Objectives:

1 - To compare the relative efficacy of two commercial hay drying agents; Agri-Dri and Emerdri.

2 - To monitor the preservative capabilities of both drying agents; Agri-Dri and Emerdri.

Methods

The hay drying agents Agri-Dri and Emerdri were applied to a second cut Alfalfa at rates and methods recommended by the suppliers (see Appendix A).

The field, approximately nine hectares in size, was divided into four blocks. One block was treated with Agri-Dri, one with Emerdri and two were left untreated. In order to determine drying rates, nine sections of windrow 3.25 meters long from each treatment were set on wire mesh trays. The trays were weighed at 10:00 a.m., 2:00 p.m.and 6:00 p.m. over 3 days. The field was tedded once on the second day and baled the third day.

For the second part of the experiment, approximately 250 bales from each treatment were stacked in three separate piles.

As the piles were being built, ten bales from each group were systematically cored with a hay auger. The cores from each treatment were bulked and sent to the Provincial Laboratory for analysis.

After the 10 bales from each treatment were cored they were tagged and placed strategically in their respective mows. Two of the bales in each mow were fitted with thermocouples to monitor temperature changes over a 90 day period.

One hundred days later the ten tagged bales in each stack were removed. The thirty bales were then recorded for laboratory analysis, and opened to inspect for colour, the presence of mold, dustiness, softness and odour.

Data:

Mowing Times - August 5

Treatment	Time
Emerdri	1:00-2:00 p.m.
Control # 1	2:00-3:00 p.m.
Agri-Dri	3:00-4:00 p.m.

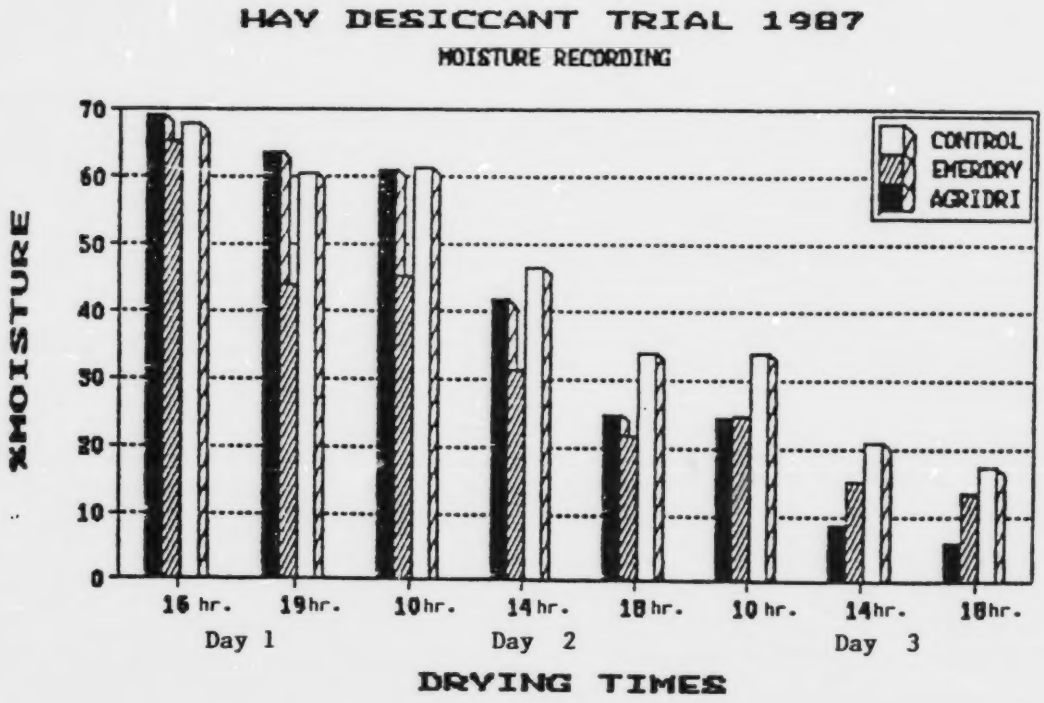
Tedding Times - August 6

Treatment	Time
Emerdri	7:50-8:20 a.m.
Control # 1	8:20-8:45 a.m.
Agri-Dri	8:45-9:15 a.m.

Baling Times - August 7

Treatment	Time
Emerdri	2:00 p.m.
Control	5:00 p.m.
Agri-Dri	3:00 p.m.

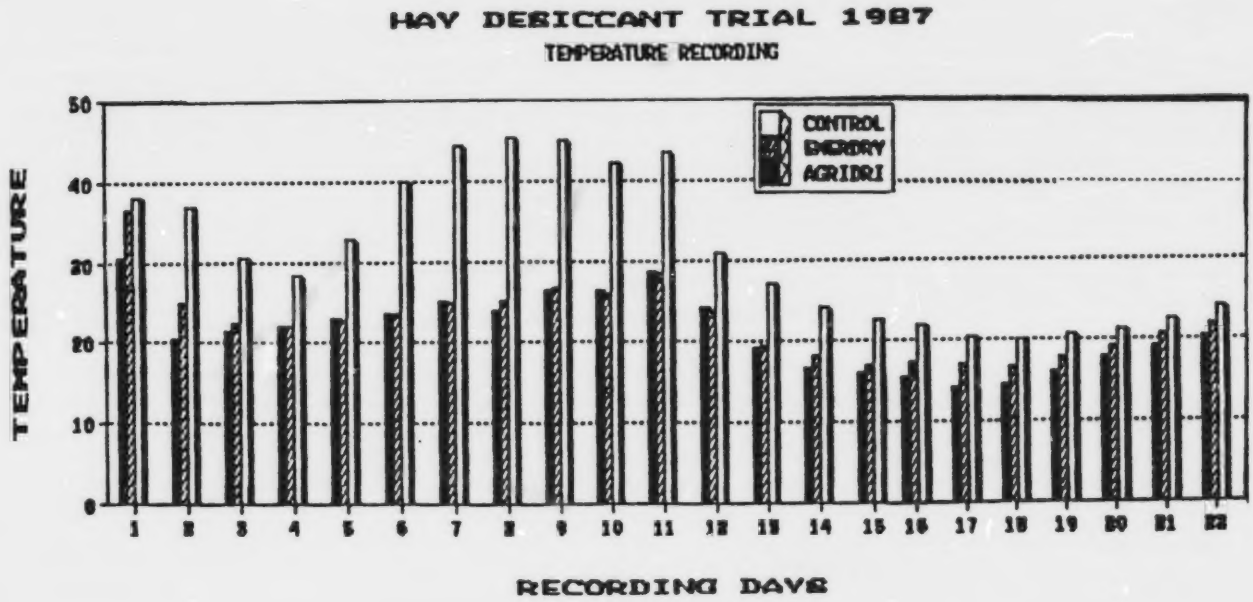
Results



The sample sections of windrow containing hay treated with Agri-Dri or Emerdri dried at much faster rates than the samples of untreated hay. The treated hays were ready to bale (<25% moisture) by mid-afternoon of day 2, twenty four hours before the control samples.

Over two hours separated the application and cutting of the hay treated with Emerdri and the hay treated with Agri-Dri. Therefore it is difficult to compare the drying performance of the two commercial desiccants. The Emerdri treated hay, which was treated and cut first, lost the most moisture the first day. The hay treated with Agri-Dri was cut last, following the untreated area and lost the least moisture on the first day.

On the second day however, the hay treated with Agri-Dri lost the greatest amount of moisture, losing 36% compared to only 22% for the Emerdri treated hay. The hay treated with Agri-Dri started the hay with 16% more moisture than the hay treated with Emerdri. By the end of the second day the Emerdri treated hay and the Agri-Dri treated hay were similar in percent moisture. On the third day, the Agri-Dri treated hay lost the most moisture finishing the day with 6% moisture compared to 13% for the Emerdri and 18% for the untreated hay.



The untreated bales heated considerably more in storage than those bales in the three mows containing treated hay. The temperature peaked six to eleven days after the bales were placed in storage. The bales containing the untreated hay generated the greatest heat with temperatures rising to 45°C. The hay treated with Agri-Dri or Emerdri only heated to 28°C and 27°C respectively.

The untreated hay (control) was baled and stored at a slightly higher moisture than the two treated hays. The moisture levels of the hays going into storage were as follows; Agri-Dri 23.8, Emerdri 20.4, Control 24.6.

Table # 1

	Crude Protein (%)		Estimated D.E. Meal/kg		Digestible Protein	
	Day 1	Day 110	Day 1	Day 110	Day 1	Day 110
Control	15.3	17.4	2.74	2.51	70.5	70.9
% Change		+13.7%		-8.3%		
Emerdri	14.6	15.4	2.64	2.51	70.5	70.6
% Change		+ 8.9%		-4.9%		
Agri-Dri	15.0	16.4	2.61	2.52	71.3	71.4
% Change		+ 9.3%		-3.4%		

There was distinct colour differences observed between hay treated with Emerdri & Agri-Dri, and the untreated hay following 120 days in storage. The Emerdri hay was much greener than the control (untreated) and slightly greener than the hay treated with Agri-Dri.

Discussion

Both hay drying agents Agri-Dri and Emerdri were effective in reducing field drying time of alfalfa hay. The treated sample hays were ready to bale twenty-four hours before the control samples.

The sample sections of windrow placed on the trays appeared to dry faster than the hay in the field. This could be due to a slight elevation of the sample off the ground. If this is the case, actual efficacy of these products might be less in a true field situation.

The efficacy of hay drying agents is directly related to such environmental factors as ground moisture, wind speed, air temperature and percent relative humidity. Hay drying agents are only as effective as the conditions for drying. Drying agents do not dry the crop. It is the wind and sun which does the drying. A drying agent only helps facilitate faster drying by allowing water within the plant stems to escape easier.

In order to get good coverage of the stems, both products require large amounts of water carrier. (See Appendix A).

Applying such large amounts of water is both inconvenient and time consuming for the farmer. The manufacturers of these products are aware of this problem and are working on ways to reduce water requirements.

The application of these products can be done using standard spray equipment consisting of push bar, spray boom, pressure regulators, pump and tank. Kits are available for mounting on a standard Haybine. The cost of a spray kit ranges from $1,500 to $1,800 dollars based on the type of pump requested. The cost of the drying agents range from $29.00/ha to $35.00/ha.

When placed in storage the bales containing hay treated with a hay drying agent did not heat as much as untreated bales. The basic ingredient of hay drying agents is a salt, potassium carbonate. Salts are known to have antimicrobial properties and therefore help to prevent spoilage in storage. The hays treated with a drying agent appeared much greener than the untreated hays. The untreated hay reached temperatures in excess of 45°C. At these temperatures the chlorophyl molecule, responsible for the green colour, begins to break down resulting in a browning of the hay. Neither of the hays treated with the drying agents reached temperatures high enough to cause colour degradation by heating.

The chemical analysis of the composite hay samples showed that the quality of both treated and untreated hay had deteriorated during storage (See Table # 1). The % crude protein increased and the % digestible energy decreased during storage for all treatments indicating that all the hay, treated and untreated, lost digestible carbohydrates. The greatest loss in digestible energy occurred in the untreated hay followed by Emerdri and Agri-Dri. Less heating, a greener colour and less digestible energy loss in the hays treated with the drying agents would seem to indicate that these products do help preserve hay quality in storage.

APPENDIX A

Hay Conditioners - Mixing and Application Specifications

EMERDRI:

60 psi at 3.5 MPH
rate - 31.2 gal/ha

Mixture (- 20 lbs Emerdri I
(- 2.6 gal Emerdri II
(- 105 gal Water

441 kilopascals at 5.6 km/hr
Rate - 350 l/ha

Mixture (- 9.1 kg Emerdri I
(- 12 l Emerdri II
(- 477 l Water

AGRI-DRI:

60 psi at 6 MPH
rate - 20.48 gal/acre

Mixture (- 40 lbs. Agri-Dri
(- 60 gal. Water

441 kilopascals at 11.5 km/hr
rate - 230 l/ha

Mixture (- 18.2 kg Agri-Dri
(-273 l Water

APPENDIX B

Weather Report for August 5, 6, and 7 - Antigonish. Information from weather summary reports published by the Department of Agriculture and Marketing.

Temperature: C	Wed., Aug. 5	Thurs., Aug. 6	Fri., Aug 7
Min.	14	10	10
Max.	24	17	20

Precipitation - 0.0mm for August 5, 6, and 7.

1987 FODDER BEET VARIETY EVALUATION TRIAL

Bill Thomas, Provincial Forage Specialist

Location: Lower Canard, Kings County, Nova Scotia

Soil: Truro Series - fine sandy loam, very well drained

Plot Size: 1.5 X 5 m

Experimental Design: Randomized Block

No. of Replicates: 4

Fertilization: At seeding 600 kg/ha 10-20-20 + .2B
3 weeks later 200 kg/ha 34-0-0

Cultivar	Tops		Bottoms	Total
	Wet Yield kg/ha	Dry Matter Yield kg/ha	Wet Yield kg/ha	Wet Yield kg/ha
1. Trestel	17445	2932	56777	74223
2. Monofia	17459	2897	47859	65319
3. Kyros	11797	2036	52121	63919
4. Yellow Intermediate	9986	2216	51772	61759
5. Peramona	6944	1229	51214	58159
6. Hugin	11953	2015	44357	56308
7. Monrosa	10887	1859	35671	47559

EAST HANTS FORAGE VARIETY DEMONSTRATION TRIAL, EST. 1986

Bill Thomas, Provincial Forage Specialist
Jack van Roestel, Provincial Soil & Crop Specialist

The East Hants Forage Demonstration site was established in response to a request by the Halifax-East Hants Federation of Agriculture, to evaluate the performance of recommended varieties on poorly drained, finely textured soils. The site is located on the property of Scothorn Farms Ltd., Hardwoodlands, on the corner of Rawdon Hills, Highway # 14 and McDonald Road. Data collected from these trials will be used to help determine cultivars which perform best on soils that are poorly drained and have a compacted layer within 20 to 50 cm of the surface.

Such soils are often saturated much of the growing season, particularly following snow melt or heavy rainfall. Both the Alfalfa and Red Clover plots were severely damaged by standing water. Both trials were situated in areas of gentle surface depressions which experienced periodic ponding. The other plots established well and came through the first winter in good shape.

Experimental protocol called for the Pasture Mixture Trial to be harvested four times, but due to poor growth brought on by drought conditions this trial was harvested only twice.

Timothy Trial

Two cuts were harvested from the Timothy Trial in 1987. Samples used to determine dry matter yield of the first cut caught fire in the drying ovens and were destroyed. Therefore it is not possible to report yields this year.

Location:	Scothorn Farm - Hardwoodlands
Plot Size:	5m x 1.5m
Experimental Design:	Randomized complete block design
No. of Cultivars:	5
No. of Reps.:	4
Date of Seeding:	May 28, 1986
Varieties:	1 Basho 2 Champ 3 Climax 4 Farol 5 Salvo

Hay Mixture Trial

Experimental Design:	Randomized block
No. of Replicates:	3
Size of Plots:	1.5 X 5 m
Fertilization:	April 10, 34-0-0, 150 kg/ha
	June 26, 18-6-18, 250 kg/ha
	Sept. 1, 10-10-30, 400 kg/ha

Mixture 80% Grass 20% Legume	Harvest Date June 17, 1987			Harvest Date Aug. 12, 1987			
	kg/ha	%CP	TDN	kg/ha	%CP	TDN	Total kg/ha
Basho Timothy Prosper Red Clover	7451 a	14.6	61.2	2029	18.9	70.9	9481 a
Champ Timothy # 1 Alsike[1]	7507 a	14.3	60.9	1694	17	55.5	9201 a
Vantage Reed Canary Prosper Red Clover	6903 ab	13.9	61.4	1844	19.3	67.2	8747 ab
Climax Timothy Prosper Red Clover	6515 ab	12.4	59.4	1774	19	72.8	8289 ab
Basho Timothy Prosper Red Clover	6194 abc	15	61.7	1793	16.6	66.5	7987 abc
Trader Meadow Fescue Prosper Red Clover	6253 abc	13.8	61.7	1636	16.9	66.2	7889 abc
Vantage Reed Canary Prosper Red Clover	5408 bcd	16.9	66.2	1871	17.3	64.3	7280 bcd
Frode Orchard Prosper Red Clover	4703 cd	13.4	63.3	1745	17.3	67.5	6448 cd
Carlton Brome Prosper Red Clover	4294 d	17.8	66.8	1835	17.6	67.3	6129 d
Saratoga Brome	4204 d	15.9	67.2	1728	19.2	69.9	5932 d

[1] Died out in establishment year

Alsike clover establishes quickly, but is very short lived, usually dying out late in the establishment year. In the test mixture containing Alsike, the Alsike component had died out following establishment, reducing the mixture to near a pure stand of Champ Timothy.

Haylage Mixture Trial

Experimental Design: Randomized Block
No. of Replicates: 3
Size of Plots: 1.5 X 5m
Fertilization: April 10/87, 5-10-30, 350 kg/ha
June 26/87, 18-6-18, 250 kg/ha
Sept. 1/87, 10-10-30, 400 kg/ha

Mixture 80% Legume 20% Grass	Harvest Date June 17, 1987			Harvest Date Aug. 12, 1987			
	kg/ha	%CP	TDN	kg/ha	%CP	TDN	Total kg/ha
Canada #1 Alsike[1] Champ Timothy	4983 a	18.4	65	1622	17.1	64.3	6605 a
Prosper Red Clover Kenhy Tall Fescue	4426 ab	18.2	65.9	2097	18.1	71.3	6523 a
Prosper Red Clover Climax Timothy	4205 ab	17.1	66	1921	19.4	70.4	6126 a
Prosper Red Clover Basho Timothy	3822 bc	16.3	64.7	2076	16.1	67.4	5898 ab
Prosper Red Clover Carlton Brome Grass	3620 bcd	15	62.6	1872	17.2	66.5	5491 abc
Prosper Red Clover Frode Orchard Grass	2908 cd	20.2	70.4	1904	18.8	68.7	4812 bc
Prosper Red Clover Trader Meadow Fescue	3035 cd	17.3	65.4	1717	16.5	66.4	4752 bc
Prosper Red Clover Saratoga Brome Grass	2872 cd	19.1	67.9	1736	19.4	69	4609 c
Prosper Red Clover Vantage Reed Canary	2712 d	19	65.7	1744	19.3	67.5	4456 c
Prosper Red Clover Venture Reed Canary	2654 d	16	65.3	1756	17.6	68.2	4409 c

[1] Died out in establishment year

Alsike clover establishes quickly, but is very short lived, usually dying out late in the establishment year. In the test mixture containing Alsike, the Alsike component had died out following establishment, reducing the mixture to near a pure stand of Champ Timothy.

Pasture Mixture

Experimental Design: Randomized Block
No. of Replicates: 3
Size of Plots: 1.5 X 5m
Fertilization: April 10/87, 34-0-0, 150 kg/ha
June 26/87, 18-6-18, 250 kg/ha
Sept. 1/87, 10-10-30, 400 kg/ha

Mixtures	Harvest Date June 17, 1987			Harvest Date Aug. 12, 1987			
	kg/ha	%CP	TDN	kg/ha	%CP	TDN	Total kg/ha
Triple Mix, 70% Timothy, 15% Alsike[1], 15% Red Clover	5309 a	15	64.8	1995 b	16.3	66.5	7303 a
Trefoil Champ Timothy	5318 a	14.3	60.4	1820 bc	15.1	64.6	7138 a
Kenhy, Champ Timothy, Ladino Clover	3782 b	13.2	65.1	2793 a	13.4	67.5	6575 a
Trader, Champ Timothy Ladino Clover	2955 bc	14.4	66.9	1478 d	17.8	67.4	4433 b
Frode O.G., Champ Timothy, Ladino Clover	2690 cd	17.1	71	1688 cd	13.6	64.6	4378 b
Johnstone, Champ Ladino Clover	2397 cde	17.6	69.9	1796 bc	14.3	65.6	4193 b
Norlea P.R.G., Champ, Ladino Clover	1801 de	15.8	71.6	1671 cd	14	66.4	3472 bc
Venture R.C., Champ, Ladino Clover	1942 de	19.3	70.6	1525 d	19.1	66.4	3466 bc
Riikka P.R.G., Champ, Ladino Clover	1498 e	18.9	70.3	1712 cd	15.1	63.8	3211 c
Palaton R.C., Champ Timothy, Ladino Clover	1431 e	21	71	1517 d	16.1	66.1	2949 c

[1] Died out in establishment year

Alsike clover establishes quickly, but does not persist. In the triple mix containing 70% Timothy, 15% Red Clover and 15% Alsike. The Alsike component did not persist into 1987. This mixture can be considered as a straight Red Clover - Timothy mix. Triple mixtures (containing Alsike) are usually lower in quality the year following seeding compared to a more simple mix of Red Clover and Timothy.

1987 STUBBLE TURNIP TRIAL

Bill Thomas, Provincial Forage Specialist

The Nova Scotia Dept. of Agriculture has been co-operating with Agriculture Canada in performance testing stubble turnips to determine those cultivars most suitable for our region. There were nine entries in the 1987 regional trial. The data collected in the regional trials is used to support the registration of superior performing cultivars. There are currently no stubble turnip cultivars licensed in Canada.

There are some very distinct differences between varieties. Some are very leafy with small root structures, others have comparatively small tops and large globe like bottoms.

There are several beef producers using stubble turnips for late season grazing. Stubble turnips are seeded mid-summer for grazing in mid-November. Stubble turnips are very high in energy allowing cattle to make good gains off pasture even in late November.

Location: Truro

Fertility: 500 kg/ha 10-20-20 + 2B

Plot Size: 5 meter X 1.25 meter

Seeding Rate: 5 kg/ha

Treatments: 9 varieties, 4 replicates

Cultivar	D.M. Yield Bottom kg/ha	D.M. Yield Tops kg/ha	Total Yield Tops & Bottoms
Buko	2256 de	8469 a	10,725 a
Sampson	5448 a	4106 de	9,555 ab
Rondo	3441 bc	5220 cd	8,661 ac
Perko	1391 f	7110 b	8,501 bc
Appin	2222 de	5990 bc	8,512 bc
Barkank	2943 cd	4807 cde	7,750 c
Marco	3745 b	3819 e	7,565 c
Jobandi	3460 bc	4030 de	7,490 c
Tyfon	1711 ef	5541 c	7,252 c

PROVINCIAL FORAGE DEMONSTRATION SITE: LOWER CANARD EST. 1985

Bill Thomas, Provincial Forage Specialist

In 1985 fourteen perennial forage observation plots were established at a forage demonstration site in Lower Canard, Kings County. The plots are composed of both mixtures and pure stands.

Several interesting facts have been observed and demonstrated from these plots.

Notice that no yield has been reported for the Alsike plot. The Alsike established very well but died late in the establishment year. This was expected since Alsike will produce a very strong seedling that establishes quickly, but does not persist. Alsike often acts like an annual weed reducing the productivity of the perennial species in a mixture. This is clearly demonstrated in comparing the performance of the triple mix plot (composed of 70% Timothy, 15% Red Clover and 15% Alsike) and the simple mix of Red Clover and Timothy.

In the establishment year 1985, the triple mix had a higher yield due to the quick establishment of the Alsike component. In 1986, though the simpler mix of Timothy and Red Clover outyielded the triple mix by 20%. In 1987, the simpler mix continued to out perform the Maritime triple mix in both yield and quality.

The demonstration site is situated on a sandy loam soil which is susceptible to drought. The warm, dry weather during late June and July reduced the regrowth of the grasses so severely following first cut that they were not harvested on July 27. The deeper rooted legumes were not as affected by the drought, producing a smaller than expected second cut on July 27th.

A chemical analysis was performed on samples collected at each harvest. Ladino Clover had the highest protein and highest energy value of any of the mixtures or species on trial. Ladino makes an excellent addition to pasture and haylage mixtures increasing the protein and energy value of the forage.

Fertilizer Dates and Rates

April 10, 1987

Legumes	5-10-30	300 kg/ha
Grasses	34-0-0	250 kg/ha
Mixtures	34-0-0	150 kg/ha

June 26, 1987

Legumes	0-10-30	250 kg/ha
Grasses	18-6-18	250 kg/ha
Mixtures	18-6-18	250 kg/ha

Plot Size 5m X 3m.

Plot	Harvest Date June 12 Yield kg/ha	%CP	%TDN	Harvest Date July 27 Yield kg/ha	%CP	%TDN	Harvest Date Oct. 23 Yield kg/ha	%CP	%TDN	Total Yield D.M. t/ha
Alfalfa	5933	15.1	59.5	1346	15.6	67.4	-	-	-	7.28
Birdsfoot Trefoil	5133	10.3	63.3	-	-	-	-	-	-	5.13
Red Clover (Double Cut)	9600	14.7	66.3	1844	14.5	66.1	-	-	-	11.44
Ladino Clover	6167	21.7	75.1	1665	16.1	66.1	571	25.7	85.0	8.40
Alsike Clover	-	-	-	-	-	-	-	-	-	-
Bromegrass	4633	10.9	61.7	-	-	-	-	-	-	4.63
Tall Fescue Hybrid	5400	11.4	63.2	-	-	-	2200	9.9	65.3	7.60
Reed Canary Grass	6333	10.2	59.1	-	-	-	2246	9.7	64.9	8.58
Timothy	6133	12.5	61.5	-	-	-	-	-	-	6.13
Mix Red Clover & Timothy	11,700	14.3	64.8	3479	17.2	71	-	-	-	15.18
Triple Mix Red Clover, Timothy & Alsike	10,400	12.9	61.1	2873	18	69	-	-	-	13.27
Orchard grass	7433	10.5	57.9	-	-	-	2535	11.7	60.9	9.97
Meadow Fescue	7133	11.8	63.3	-	-	-	1913	16.0	71.7	9.05
Pasture Mix Kenhy, Orchard-grass, Ladino Clover	7967	12.8	62.1	2925	16.8	65	1299	19.0	76.8	9.27

WEST HANTS PASTURE TRIAL

Alexander J. Wilson, Soil & Crop Specialist

CO-OPERATORS:

Mr. Garnet Zillig
Mr. Peter Marsh & Sons

OBJECTIVE:

To evaluate pasture species for winter survival and productivity in a non-replicated trial in Hants Co.

PROCEDURE:

Four mixtures were planted in the spring of 1985 at Garnet Zilligs, Scotch Village. The mixtures were as follows:

(1) Kenhy-Orchard grass (30-70)
(2) Bison
(3) Ensilo
(4) Kenhy-Orchard grass (50-50)

The Bison & Ensilo plots winter killed the first winter. Bison and Ensilo plots were harrowed and reseeded to Johnstone Tall Fescue and Bastion perennial ryegrass on May 26, 1987.

The Kenhy-Orchard grass (50-50) field was divided into 2 plots. Five cuts were taken throughout the summer.

At Peter Marsh and Sons a 50-50 mixture of Tetralite ryegrass-Johnstone tall fescue was planted along with Johnstone tall fescue and Tetralite alone for comparison. The plots were planted May 18, 1987 and received 150 kg/ha of 17-17-17 at planting and 3 applications of 150 kg of 34-0-0 through the growing season. In the fall an application of 4.4 t/ha of lime was applied to correct a low pH.

The results were as follows:

Garnet Zillig

Cultivar	Kg/ha	% P	% TDN	Replacement $ Value
Kenhy-Orchard (30-70)	5,854	18.7	69.4	1,182
Kenhy-Orchard (50-50)	4,627	15.3	66.4	816
Kenhy (50-50)	4,403	18.0	68.5	865
Bastion (Seeding Year)	1,698	21.8	73.3	386
Johnstone (Seeding Year)	1,293	23.2	75.0	309

Peter Marsh & Sons

Cultivar	kg/ha	% P	% TDN	Replacement $ Value
Tetralite	4,579	26.8	76.6	1,208
Johnstone	3,821	30.2	75.8	1,093
Mixture (50-50 Tetralite-Johnstone)	3,672	24.5	75.7	910

HARVEST DATE

Garnet Zillig

Cut # 1 4/6/87
Cut # 2 29/6/87
Cut # 3 24/7/87
Cut # 4 10/8/87
Cut # 5 5/10/87

Peter Marsh & Sons

Cut # 1 20/7/87
Cut # 2 10/8/87
Cut # 3 10/8/87

DOLLAR VALUE BASED ON THE REPLACEMENT COST OF PROTEIN AND TDN PRODUCED USING:

Corn at $ 147.8 /tonne 48% Soy at $ 408.64 /tonne.

DISCUSSION

Kenhy is a strong sod forming coarse grass with good winterhardiness and drought resistance. Kenhy also exhibits a good tolerance for poorly drained land.

Orchardgrass on the other hand is very palatable when grazed early. It does show very good drought resistance, extremely fast recovery following a drought and very good growth during the establishment year. Orchardgrass does not have the winterhardiness of Kenhy or the ability to tolerate wet feet. As a result a mixture of the two should do well under a variety of conditions.

Yields are down in 1987 due to drought conditions.

The 30-70 Kenhy-Orchard grass mixed with 1 kg of Ladino per hectare outperformed the 50-50 mixture of Kenhy-Orchard grass under the dry conditions that existed this year.

The Bastion & Johnstone are in their establishment year and therefore cannot be expected to do as well as the established mixtures.

The Marsh site did well considering that it was a dry year, planted May 18th with low pH. The site was well fertilized which contributed to the high protein and TDN from this site.

The sites will be monitored for one more year.

ANNUAL FORAGE TRIAL

A.J. Wilson, Soil & Crop Specialist

CO-OPERATOR: Dennis Ells

OBJECTIVE:

To look at cereal-ryegrass-legume mixtures to evaluate productivity, drought tolerance and evaluate cereal-annual ryegrass mixtures for haylage.

PROCEDURE:

Eleven different treatments, replicated four times, were evaluated for their effect on productivity.

The treatments were as follows:

1. Promenade Ryegrass @ 22.4/kg/ha.
2. Nitro Alfalfa @ 22.4 kg/ha.
3. Leger Barley @ 150 kg/ha.
4. Sentinel Oats @ 112 kg/ha.
5. Persian Clover @ 22.4 kg/ha.
6. Promenade-Nitro @ 11.2-11.2 kg/ha.
7. Promenade-Leger @ 22.4-61.6 kg/ha.
8. Promenade-Persian Clover @ 11.2-11.2 kg/ha.
9. Persian Clover-Nitro @ 11.2-11.2 kg/ha. (ALF-CLO)
10. Promenade-Persian Clover-Nitro @ 11.2-5.6-5.6 kg/ha. (R-C-A)
11. Promenade-Persian Clover-Nitro-Leger @ 11.2-5.6-5.6-61.6 kg/ha. (R-C-A-B)

Plots were sown on the 21/May/1987. Fertilizer applications were as follows:

All Plots:

29/5/87 4-18-18 @ 560 kg/ha
24/7/87 5-10-30 @ 350 kg/ha

Non-Legume Plots:

5/6/87 34-0-0 @ 80 kg/ha
24/7/87 34-0-0 @ 100 kg/ha

Other treatments include the use of MCPA amine 500 at 1.7 L/ha on all non-legume plots.

Ryegrass Cereal Legume Trial

Cultivar	Cut # 1 t/ha	Cut # 1 % P	Cut # 1 % TDN	Cut # 2 t/ha	Cut # 2 % P	Cut # 2 % TDN	Total t/ha	Replacement $ Value P and TDN
Sentinal	2.7	15.1	73.3	-	-	-	2.7	501
Leger	2.6	15.9	67.2	-	-	-	2.6	462
Ryegrass-Barley	2.0	15.3	68.2	1.1	16.5	77.0	3.1	595
R-C-A-B	1.3	13.5	69.1	.8	19.1	74.1	2.1	395
Alf-Clover	.9	20.3	74.8	.8	20.6	75.4	1.7	370
Persian Clover	.9	19.3	68.9	.9	22.8	72.0	1.7	380
Ryegrass-Alf.	.8	17.0	68.5	.3	14.4	73.8	1.1	213
Promenade	.8	25.8	76.8	1.3	15.2	74.5	2.1	445
R-C-A	.8	14.8	69.8	.9	19.1	74.1	1.7	335
Nitro	.8	19.2	74.8	-	-	-	.8	162
Ryegrass-Clover	.8	15.5	68.6	1.0	18.0	74.2	1.8	350

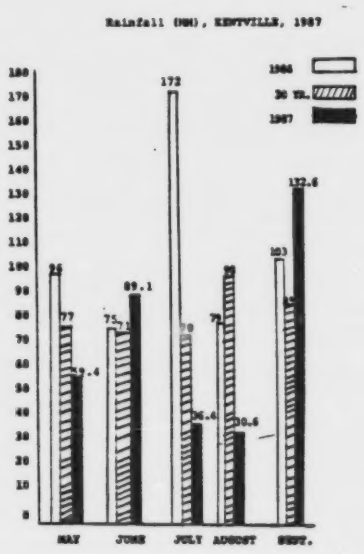
DOLLAR VALUE BASED ON:

Corn at $ 147.8 /tonne; 48% Soy at $408.64 /tonne.

HARVEST DATE

Cut # 1 8/7/87-14/7/87*
Cut # 2 13/10/87

Total: CV=19.1 LSD(0.5)=224



% NO3 at Harvest

Cultivar	Kg/ha	% P	% TDN	% NO3	Date
Leger Cut # 1	2,552	15.9	67.2	.12	8/7/87*
Sentinel Cut # 1	2,747	15.1	73.3	.57	14/7/87*
Promenade Cut # 1	787	25.8	76.8	.76	8/7/87*

Discussion

By adding a cereal to Annual Ryegrass the yield of the first cut was nearly tripled that of ryegrass alone.

Yield of the second cut of ryegrass and barley was not significantly lower than the Promenade ryegrass plot. Therefore adding barley was beneficial and did not suppress the ryegrass.

Yields are lower than expected. Annual ryegrass should yield 11,000 kg/ha, but yields can be drastically reduced by drought. (Figure Rainfall) Such was the case which resulted in lower than expected yields.

The plots were not planted until the 21/May/87 which made the effect of the drought much worse.

Cereals establish and grow much faster than annual ryegrass but have very little regrowth. Thus they are better able to take advantage of early moisture. As a result, cereal-ryegrass combinations are better able to out-yield annual ryegrass by itself affording some drought protection.

Legume-Ryegrass Mixtures

The addition of barley increased the yield of legume ryegrass mixtures.

The Nitro annual alfalfa did not do well. The Persian clover introduction from Agriculture Canada, Charlottetown did much better. If planted early, Persian clover-ryegrass could prove to be a good mixture for the Atlantic region.

Barley or Oats

The question often arises, should it be barley or oats for a cover crop?

When harvesting cereals it is important to harvest the cereal before it has headed. Leger barley was ready to harvest 6 days prior to Sentinel oats.

From identical N applications Leger barley produced .12% NO_3, Sentinel oats, .57% NO_3 and Promenade ryegrass .76% NO_3.

Being able to cut or graze 6 days earlier is a definate plus as the regrowth can begin 6 days sooner.

Low % NO_3 in cereals is extremely important as .8% or above can cause serious harm to livestock.

For these two reasons barley should be the cereal of choice for a cover crop.

Ryegrass-Cereal for Haylage

Introduction

Ryegrass is known for its ability to boost organic matter and to be notoriously hard to dry down to make into haylage.

100 hectares of ryegrass-cereal were planted by Dennis Ells to evaluate the mixture for haylage.

Procedure

40 kgs of common oats were mixed with 6 kgs of Marshall ryegrass and sown the first week of May at 114 kgs/ha. Yields were taken on June 30/87 from four locations within the field.

Yields ranged from 3.13 t/ha to 6 t/ha on a dry matter basis with an average yield for the field of 4.9 t/ha. The field was sampled on July 3rd, 6th, 8th and 15th (see Feed Analysis).

Livestock Feed Analysis Report

Material	Cut Date				
Ryegrass-cereal	30/June	3/July	6/July	8/July	15/July
Crude Protein	14.9	8.6	10.7	12.1	9.3
TDN	67.2	63.0	59.7	58.1	64.1
Calcium	0.62	0.42	0.39	0.41	0.42
Phosphorus	0.33	0.24	0.27	0.23	0.25

In less than 60 days after planting the ryegrass cereal mixture had reached the boot stage (30/June) and was ready for harvest as an excellent quality haylage. Two weeks later, (July 15th) fully headed out the ryegrass cereal mixture made a less desirable haylage.

Conclusion

Barley should be the cereal of choice unless hectares warrant the use of oats to preserve quality by spreading the optimum time to harvest.

Particular attention should be paid to % NO_3 as levels of 0.8% and above can cause serious problems.

The addition of a cereal to annual ryegrass allowed the use of a haybine for cutting the mixture. Annual ryegrass alone can be very difficult to dry down and difficult to cut with a haybine.

If ryegrass-cereal mixtures are managed well they should make excellent haylage for ruminants.

EVALUATION OF A DIRECT CUT-FORMIC ACID TREATED GRASS SILAGE FOR FINISHING BEEF CALVES

Robert Cooper, Co-operating Farmer
Jack van Roestel, Crops Extension Specialist

The following is a report on an A.F.D.A. Technology Acceleration project that commenced in the summer of 1986, and which has been prepared by the participating farmer, Mr. Robert Cooper.

The overall objective of the project is to demonstrate to beef farmers of Nova Scotia the potential of producing and feeding high quality grass-legume silage, at a reasonable investment, with the Direct Cut-Formic Acid Treated Forage System.

1986 Project Work

The study got underway with the building of two acid preserved silage heaps; one of 100T (second cut alfalfa) and the other 40T (third cut alfalfa).

A group of 18 Hereford-Scothorn calves were fed a ration of acid preserved silage supplemented with 225 gm/day of fishmeal.

The calves were weaned in early December and treated for internal and external parasites. Steers were implanted with Synovex S. Heifers were not implanted. The calves became quickly accustomed to the ration, having eaten silage with their dams before weaning.

The cattle were thus well on feed when first weighed on January 26th. The silage being fed then might best be described as being of excellent quality - T.D.N. of 74% and protein 22%.

The cattle were weighed again three weeks later when average gains of 54 lbs. were recorded - an average daily gain of 1.17 kgs (2.57 lbs).

At this time the excellent quality silage was finished and the cattle were worked back on the second-cut silage. This might best be described as being of marginal quality for an all-forage diet - 55% T.D.N., 18% protein.

The third and final weighing on March 9th recorded average gains of 47 lbs/head (1.03 kgs/day or 2.26 lbs). Unfortunately, our tight feed supplied dictated the need to sell the calves at this time.

The average daily gain recorded over the 42 days was 1.1 kgs/day (2.42 lbs). While a short feeding period such as this does not provide a reliable guide as to what might be expected on a large group of calves fed for a complete winter, it provides an indication of the potential for high gains which might be achieved on low D.M. grass silage - fishmeal diets.

1987 Project Work

During the summer of 1987 we approached acid preservation with more confidence.

We looked at two options. The first was the modified Kapuskasing (Kap) method, using one tractor powering the flail chopper with self-unloading forage wagon hitched behind the chopper, a second tractor hauling from the field and unloading onto a solid bottom elevator moved slightly between loads and thus forming heaps. Acid could be applied at the elevator or on the chopper.

The second option was to employ a third tractor with front-end loader to build tramped heaps and use dump wagons instead of self-unloading forage wagons.

The modified Kap method appeared to be the more attractive one, although the self-unloading forage wagons would be somewhat slower to unload. This option requires only two men and tractors versus three. Contamination of the silage with soil is also avoided, an important consideration. Small amounts of soil can inoculate silage with Clostridia which produces butyric acid, degrading an otherwise well-preserved silage. Such contamination is difficult to avoid where packed heaps are formed on anything other than concrete or black-top.

In 1986 we encountered problems in speed of unloading - the long-cut grass tended to bridge where it dropped off the unloading auger of the forage wagon onto the silage elevator. We had a fair amount of surface spoilage on our heaps in spite of efforts to groom them before covering with plastic. In spite of these problems we thought it worth another try.

Our first objective was to try to improve the speed of silage making. The bridging problem occurred when a slug of grass emerged from the forage wagon auger. A third beater was installed on the wagon having only two beaters. We also arranged to unload the wagons so that the grass spouted from the wagon auger in the direction of the moving elevator belt instead of against the side of the hopper at the base of the elevator.

Considerable man-hours were spent in grooming so that the 2-man method in effect required three men. In spite of this effort the settled heaps showed humps and hollows, indications of costly surface spoilage.

Two heaps were made using this modified Kap method in 1987. A small heap of about 17T D.M. was made to be used for feeding cows after calving in the spring. We used 9.8m or 32 ft. plastic for covering this first-cut alfalfa-timothy, which was treated with 3 kg/T (wet) of formic acid at the elevator.

A larger heap of 40T D.M. was made ensiling a crop of timothy cut in the early boot stage. This was treated with formic acid at 2 kg/T applied at the harvester. This will be the first heap to be fed this winter to a group of 39 beef calves.

A packed heap consisting of orchardgrass and ladino and second-cut alfalfa, both cut in vegetative stages and treated at a rate of 4 kg/T was made containing around 17T D.M.

Red Clover (second-cut) was ensiled in packed heap, treated at 2 kg/T giving us perhaps 60T D.M. A few loads of third-cut alfalfa were added to this heap.

Addition of the acid at the harvester worked well. The applicator is easy to calibrate and with care user-safety does not appear to be a problem. Beyond removal of some paint there did not appear to be a bothersome amount of corrosion.

Preliminary performance impressions are that this approach produces good quality, direct cut silage without a large capital investment in equipment* (2 tractors, 2 wagons, elevator and acid applicator). Granted, there are significant annual costs of acid at $12-25/Dry Matter tonne (formic applied at 2-4 kg/wet tonne), however this is counter-balanced by substantial savings in labour, fuel, and elimination of field losses with the direct cut-treated silage compared to the conventional haylage method.

A comprehensive monitoring of forage quality, animal feed intake and gain will be done over the January-May feeding period.

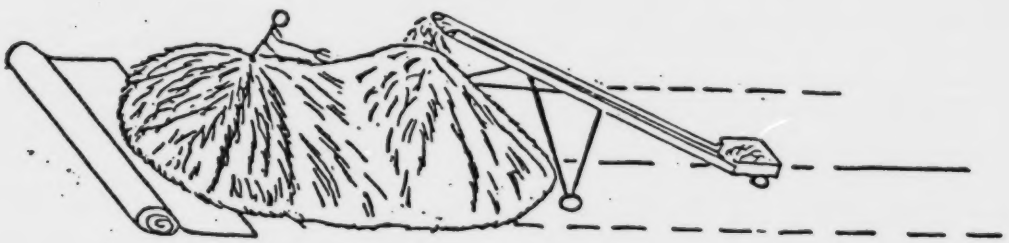


Fig. 1: Forming the Heap Silage Stack with an Elevator

* An acid applicator and manual transfer pump were purchased from England at a cost of $1800. An elevator made especially for silage was purchased in Quebec at a cost of $3800. It is capable of unloading a forage wagon in 3 1/2 minutes. Two "homemade" front unloading forage wagons were built for a cost of $3500 each, plus a shale base slab area was prepared to place the heaps on.

LUNENBURG CO. SOIL & CROP IMPROVEMENT ASSOCIATION
FORAGE DEMONSTRATION SITE

John Wilson, Soil & Crop Specialist
Bill Thomas, Provincial Forage Specialist
Arthur Pick, Agricultural Representative

Procedure:

A site 12m x 24m was sprayed with round-up, limed at 9 t/ha and fertilized with 250 kg/ha of 17-17-17.

The site was divided into 4 equal plots and planted to:

Barcoli forage rape	(7 kg/ha)
Maris Kestrel kale	(6 kg/ha)
Marco stubble turnips	(6 kg/ha)
Appin stubble turnips	(6 kg/ha)

It should be noted that drought conditions resulted in slow emergence and growth until early September rains brought things on. Plots were harvested Oct. 6, 1987 with the following results:

Cultivar	Kg/ha	% P
Barcoli Rape	3900	30.7
Marco Stubble Turnips	5400	27.1
Appin Stubble Turnips	5000	30.0
Maris Kestrel Kale	2700*	31.5

* Planted too late.

Discussion

Brassicas can furnish quality late season pasture and can produce phenominal growth in a short period of time. Dates of planting for Turnips - mid July; Kale - late May, early July; Rape - mid June, late July.

For further information on Brassicas see Soils & Crops Factsheet.

WINTER WHEAT RATE OF SEEDING TRIAL

Dwane Mellish, Assistant Director

The effect of seeding rate on the yield of three winter wheat varieties with a range of tillering capacity was evaluated under a management regime which minimized disease and lodging pressure.

Location:	Brookside		
Preceding Crop:	Annual Ryegrass	Soil Type:	Sandy loam
Seeding Date:	September 15, 1986	Harvest Date:	August 14, 1987
Plot Size:	1.25m X 6m	Row Spacing:	15 cm
Fertilization:	400 5-20-20 @ planting		
	150 34-0-0 early spring		
	150 34-0-0 ZGS 30/31		
Fungicide:	125 gai Bayleton ZGS 30/31		
	125 gai Tilt + 1000 gai Bravo ZGS 45		
PGR:	Cycocel 2 l/ha @ ZGS 30		

Results:

ANOVA Table for Parameters Measured

	Winter Survival	Height	Heads /m^2	Test Wt.	1000 k. wt.	Yield
Variety	**	**	NS	**	**	*
Seeding Rate	**	NS	**	*	**	**
Variety x Rate	NS	NS	NS	NS	NS	NS

Borden was most winter hardy (86%) followed by Monopol (74%) while Vuka had significantly lower winter survival (55%). Seeding rate had a significant influence on heads/m^2. Plants in the lowest seeding rate tillered to a high degree providing a minimum of 240 heads/m^2 (Vuka) but the highest head population was only 400 heads/m^2 (Borden) at the 600 seeds/m^2 seeding rate.

Seeding rate had a significant effect on yield with the lowest yields at the low seeding rate and the highest yields with the highest seeding rate.

Yield of Grain (t/ha)

Seeding Rate Seeds/m^2	Borden	Monopol	Vuka
100	5.7	4.7	4.5
200	6.6	5.4	4.4
300	6.8	6.1	5.6
400	6.9	5.3	5.6
500	7.0	6.1	5.5
600	7.2	6.2	5.4
L.S.D.			

The lower seeding rates did compensate greatly for the lower seeding rate and all varieties reached their maximum yield between 300 and 400 seeds/m^2 seeding rate.

This project will continue for one more year to broaden the data base.

SPRING WHEAT AND TRITICALE PRODUCTION MANAGEMENT TRIAL

Dwane Mellish, Assistant Director

The response of five spring wheat and two spring triticales to four levels of management was evaluated.

Location:	Highland Village			Co-operator:		Gary Brown		
Soil Analysis:	pH	O.M.	P_2O_5	K_2O	Ca		Mg	
	6.2	4.9	255 M+	181 M	1959 L		526 M+	

Preceding Crop:	Oats	Soil Type:	Sandy Loam
Seeding Date:	April 27, 1987	Harvest Date:	August 25, 1987
Seeding Rate:	400 k/m^2	Exp. Design:	Split plot

Fertilization: All treatments at planting 400 kg/ha 17-17-17

Milton, Belvedere and Messier are considered to be feed wheats, Sinton is a Western bred milling wheat, while Max is a German milling quality wheat. Trit 4 and Beaguelita (Trit 3) are spring triticales. All were evaluated under the following four management levels;

I Standard	- 70 kg of N/ha at planting
II Additional N	- Management I + 50 kg of N/ha at ZGS 30 + ZGS 45
III Add N + Fung	- Management II + Tilt @ 125 gai ZGS 45 Bravo @ 1000 gai ZGS 45
IV Add N + F + PGR	- Management III + Cerone @ 360 gai ZGS 39/45

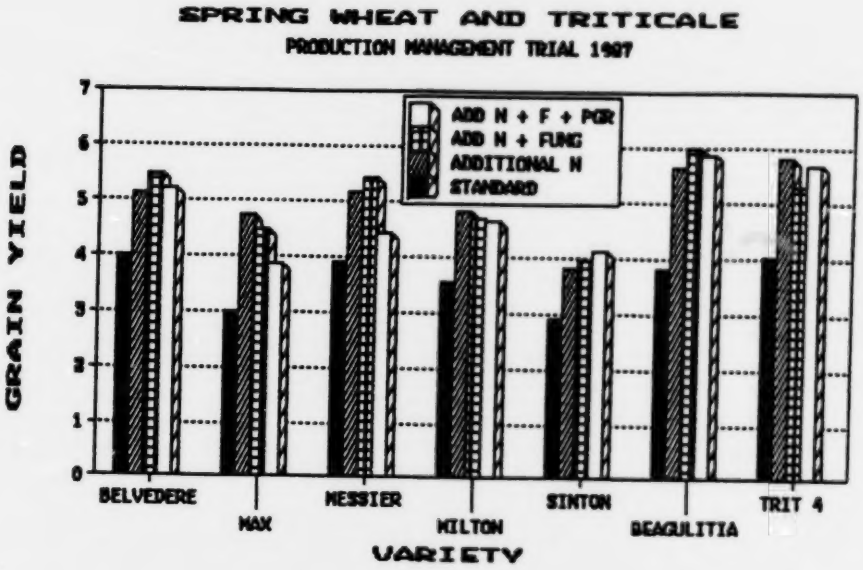
Disease pressure was low and only a low level of Septoria occurred late in the season. No lodging occurred.

Additional nitrogen increased yield significantly and also improved kernel wt. Because of low disease pressure, little yield response occurred due to the disease control but it did moderately improve 1000 kernel weight.

Spring Wheat and Triticale Yields (t/ha)

	Management Level			
Variety	I Stan	II Add N	III Add N + F	IV Add N + F + PGR
Belvedere (F)	4.01	5.15	5.50	5.22
Max (M)	3.01	4.73	4.48	3.87
Messier (F)	3.92	5.19	5.44	4.43
Milton (F)	3.58	4.82	4.69	4.65
Sinton (M)	2.92	3.81	3.97	4.13
Beaguelita (T)	3.83	5.67	6.01	5.90
Trit 4 (T)	4.05	5.82	5.31	5.72

F = Feed M = Milling T = Triticale



The triticales were the highest yielding grains in the trial and responded greatly to the additional nitrogen application. Belvedere was the highest yielding feed wheat, while Max was the best yielding milling wheat.

SPRING CEREAL RATE OF SEEDING TRIAL

Dwane Mellish, Assistant Director

Seeding rates of cereals has drawn new interests with the improved management of cereal grains.

In 1987 the second year of a three year study, investigating the response of spring cereals to a range of seeding rates was completed. In the study fungicides were used to reduce disease pressure and a plant growth regulator was used where appropriate to reduce loding.

Location:	Highland Village			Co-operator:		Gary Brown
Soil Analysis:	pH	O.M.	P_2O_5	K_2O	Ca	Mg
	6.2	4.9	255 M+	181 M	1959 L	526 M+

Preceding Crop: Oats — Soil Type: Sandy Loam
Seeding Date: April 27, 1987 — Harvest Date: August 15, 1987
Plot Size: 1.25m X 6m
Fertilization: 400 kg/ha 17-17-17 at planting
150 kg/ha 34-0-0 at ZGS 30

	Fungicide	P.G.R.
2 Row Barley (Rodeo)	Tilt 125 gai ZGS 45	Nil
6 Row Barley (Leger)	Tilt 125 gai ZGS 45	
Spring Wheat (Max)	Tilt 125 gai ZGS 45 Bravo 500 gai ZGS 45	Cerone 360 gai ZGS 45
Spring Triticale (Beaguelita)	Tilt 125 gai ZGS 45 Bravo 500 gai ZGS 45	Nil

ANOVA Table for Parameters Measured

	Rodeo	Leger	Max	Beaguelita
Plants/m^2	**	**	**	**
Plant ht_2	NS	*	NS	NS
Heads/m^2	**	**	NS	**
Leaf Disease	NS	NS	NS	NS
Head Disease	NS	NS	NS	-
Kernel wt.	NS	**	NS	*
Test wt.	**	**	**	NS
Yield	**	NS	**	**

Mean Separation of Significant Effects of Seeding Rate

Plants/m^2

Seeding Rate Seeds/m^2	Rodeo	Leger	Max	Beaguelita
100	86 d *	125 d	124 d	140 c
200	128 c	221 c	211 c	197 bc
300	162 c	321 b	263 c	249 b
400	221 b	326 b	317 b	389 a
500	294 a	434 a	371 b	377 a
600	294 a	488 a	488 a	445 a
LSD	38	70	54	

Heads/m^2

Seeding Rate Seeds/m^2	Rodeo	Leger	Max	Beaguelita
100	293 b	194 c	233	195 c
200	297 b	236 bc	272	273 bc
300	317 b	192 c	300	262 bc
400	363 ab	338 ab	315	305 ab
500	362 ab	350 a	396	353 ab
600	428 a	389 a	372	374 a
LSD	73	105	NS	91

Grain Yield (t/ha)

Seeding Rate Seeds/m^2	Rodeo	Leger	Max	Beaguelita
100	3.89 cd	4.30	3.32 b	3.52 c
200	3.65 d	4.82	4.31 a	4.49 b
300	4.18 bc	5.05	4.22 a	4.52 b
400	4.20 bc	4.86	4.75 a	4.75 b
500	4.53 ab	4.69	4.64 a	5.37 a
600	4.86 a	4.96	4.51 a	4.95 ab
LSD	0.43	NS	0.52	0.56

* Numbers followed by the same letter are not significantly different at the 5% level according to Duncans Multiple Range Test.

Rodeo and Leger reached the maximum number of plants/m^2 with a seeding rate of 500 seeds/m^2, Beaguelita showed no significant increase in plants/m^2 above a seeding rate of 300 seeds/m^2, while Max required 600 seeds/m^2 to reach its maximum plant establishment.

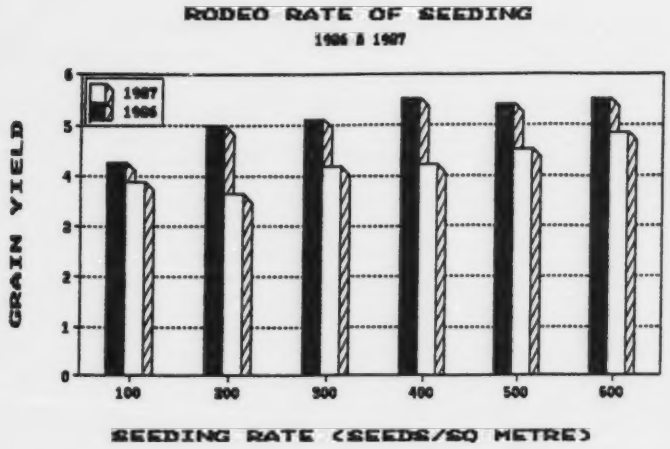
All of the species reached the maximum number of heads/m^2 with a seeding rate of 400 seeds/m^2.

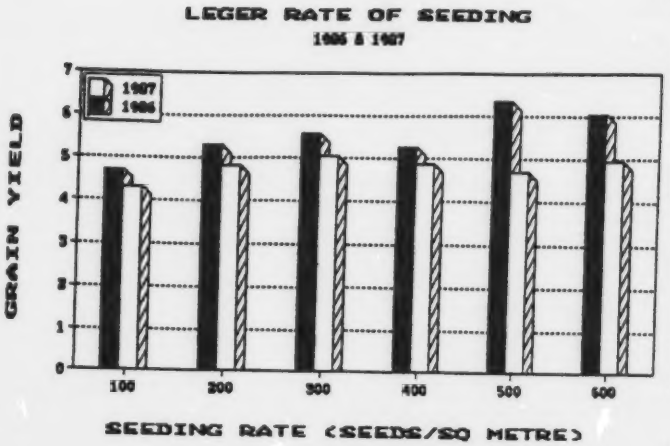
The Rodeo and Beaguelita gave the highest grain yield at the 500 seeds/m^2 seeding rate. Max showed no significant statistical yield increase above 200 seeds/m^2, however it tended to yield highest at the 400 seeds/m^2. The Leger did not respond greatly to seeding rate but there was a very large difference in 1000 k wt with a 1000 k wt of 43.7 gms/1000 at the lowest seeding rate and was reduced to a low of 33 gms/1000 at the 600 seeds/m^2 seeding rate.

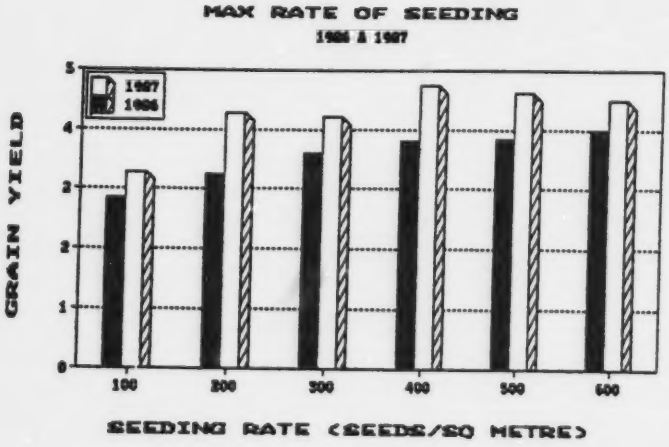
Dry conditions during grain fill limited kernel filling and possibly limited the yield potential, particularly of the high population treatments.

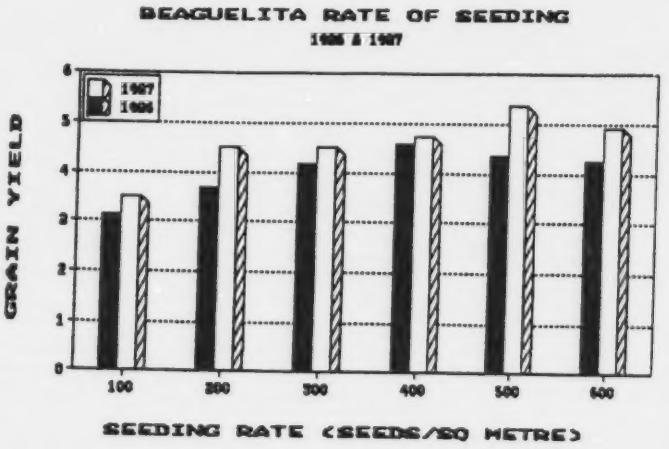
A better indication of the response to seeding rate is seen by combining the two years results which are shown graphically. In both years disease pressure was kept low and no lodging occurred.

The yield response to seeding rate was somewhat different between years. A third year of this study will be very helpful in establishing more concrete seeding rate recommendations when diseases and lodging are not a limiting factor.


RODEO RATE OF SEEDING
1986 & 1987
GRAIN YIELD
1987
1986
0
1
2
3
4
5
6
100
200
300
400
500
600
SEEDING RATE (SEEDS/SQ METRE)


LEGER RATE OF SEEDING
1986 & 1987
GRAIN YIELD
1987
1986
0
1
2
3
4
5
6
7
100
200
300
400
500
600
SEEDING RATE (SEEDS/SQ METRE)


MAX RATE OF SEEDING
1986 & 1987
GRAIN YIELD
1987
1986
0
1
2
3
4
5
100
200
300
400
500
600
SEEDING RATE (SEEDS/SQ METRE)


BEAGUELITA RATE OF SEEDING
1986 & 1987
GRAIN YIELD
1987
1986
0
1
2
3
4
5
6
100
200
300
400
500
600
SEEDING RATE (SEEDS/SQ METRE)

BARLEY PRODUCTION MANAGEMENT TRIALS

Dwane Mellish, Assistant Director

The third year of assessing the response of 2-row and 6-row barley varieties to four levels of management has been concluded.

Location:	Highland Village			Co-operator:		Gary Brown
Soil Analysis:	pH	O.M.	P_2O_5	K_2O	Ca	Mg
	6.2	4.9	255 M+	181 M	1959 L	526 M+

Preceding Crop:	Oats	Soil Type:	Sandy Loam
Seeding Date	April 27, 1987	Harvest Date:	Aug. 15, 1987
Seeding Rate:	400 seeds/m^2	Exp. Design:	Split plot
Plot Size:	1.25m X 6m		
Fertilization:	All treatments received 400 kg/ha 17-17-17 prior to planting		

Seven 2-row and six 6-row lines/varieties were tested. All were evaluated under the following four management levels.

1) Standard = 70 kg of N/ha at planting
2) Additional N = Mgt. I + 50 kg of N/ha at ZGS 30/31 (shooting)
3) Add N + Fung. = Mgt. II + Tilt 125 g ai ZGS 45 (Boot)
4) Add N + Fung + PGR = Mtg. III + Cerone @ 280 gai ZGS 45.

Results:

This location was subjected to a prolonged dry period during tillering and also during grain fill, which limited both tillering and yield levels.

Due to the dry weather disease pressure and lodging was also low.

2-Row Barley

The responses to the input levels were as follows:

Additional Nitrogen - Increased heads/m^2 consistent with 1986, disease level was similar to standard treatment, no lodging occurred.

Adding Fungicide - Reduced the disease symptoms more so on disease susceptible varieties, increased seed weight by 4 gms/1000 kernels and resulted in a significant yield increase to AB73-3, AB80-1, Birka and Rodeo.

Reduced plant height by an average 14 cm and significantly delayed heading but did not reduce grain yield. No lodging occurred in any treatments.

2-ROW BARLEY GRAIN YIELD (t/ha)

Variety	I Stan	II Add N	III Add N + F	IV Add N + F + PGR
Albany	4.1	4.1	5.0	5.3
AB78-1	4.3	4.8	4.9	4.8
AB80-1	4.0	4.1	4.6	4.5
Birka	3.8	3.8	4.5	4.3
KGSB84-6	3.9	4.4	4.4	4.3
Micmac	4.0	4.4	4.7	4.9
Rodeo	4.1	4.0	4.9	4.6
Mean	4.0	4.3	4.7	4.7

The highest yielding variety was the newly registered Albany which responded very much to the fungicide treatment. Rodeo also performed very well.

6-Row Barley

Additional Nitrogen - Increased yield only slightly and increased protein by 1%.

Fungicide - Increased seed weight by average of 3 gms/1000 kernels, yield by average of 0.6 tonne/ha and kept disease symptoms low.

PGR - No lodging occurred and had no significant effects on most trials.

6-Row Barley Grain Yield (t/ha)

Variety	I Stan	II Add N	III Add N + F	IV Add N + F + PGR
Bruce	4.0	4.3	4.9	4.8
Cadette	3.6	3.3	4.4	3.8
Joly	4.2	4.5	5.5	5.8
Laurier	4.2	4.7	5.0	5.1
Leger	4.1	4.6	4.9	4.8
OB621-4	4.5	5.1	5.2	5.1

The newly registered variety Joly performed very well. OB621-4 yielded consistently well as did Leger. Cadette responded well to the disease control but due to the limited moisture and thus a moderate yield potential location Cadette did not perform exceptionally well. Cadette has been shown in the past to be a variety for high yield environments.

Cost of production figures were used to calculate the cost/tonne of grain produced under the four management systems. Variable costs were calculated to be $336/hectare including costs for production, harvesting and cost over head based on Farm Management Fact Sheet 1986-104. It is assumed barley was grown on a farm with more than the barley enterprise sharing the fixed cost. A fixed cost of $138 is used. A straw credit of $50/ha is deducted from the total cost. The base cost of production therefore is (336 + 138 - 50) $424/ha.

The cost of additional management inputs without an application change are as follows:

Nitrogen (150 kg/ha 34-0-0) = $47.00
Fungicide (0.5 L/ha Tilt) = $45.00
Plant Growth Regulator (0.75L of Cerone) = $28.00

2-Row Barley Cost of Production

Variety	Stan ($424/ha)		Add N ($471/ha)		Add N + F ($516/ha)		Add N+F+PGR ($544/ha)	
	Yield	$/t	Yield	$/t	Yield	$/t	Yield	$/t
Albany	4.1	103	4.1	115	5.0	103	5.3	103
AB78-1	4.3	99	4.8	98	4.9	105	4.8	113
AB80-1	4.0	106	4.1	115	4.6	112	4.5	121
Birka	3.8	112	3.8	124	4.5	115	4.3	127
KGSB84-6	3.9	109	4.4	107	4.4	117	4.3	127
Micmac	4.0	106	4.4	107	4.7	110	4.9	111
Rodeo	4.1	104	4.0	117	4.9	105	4.6	118

6-Row Barley Cost of Production

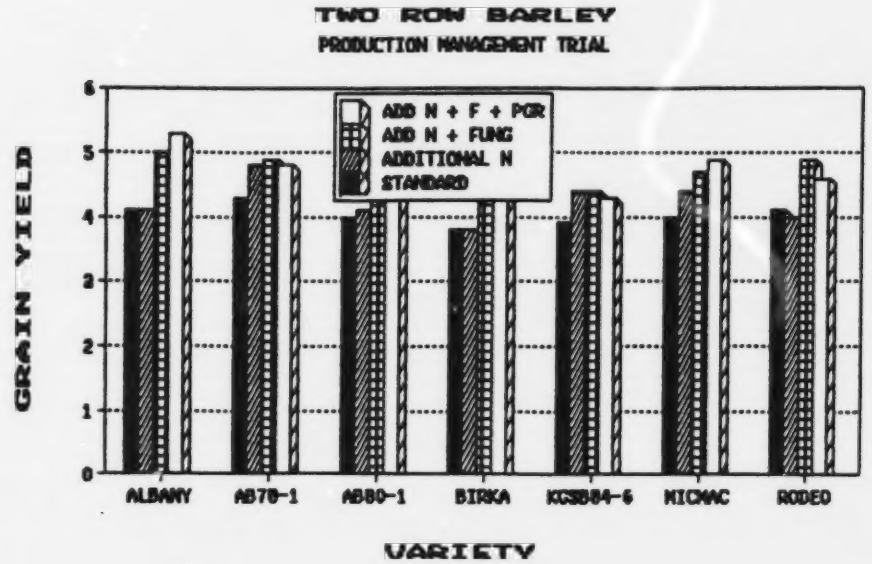
Variety	Stan ($424/ha)		Add N ($471/ha)		Add N + F ($516/ha)		Add N+F+PGR ($544/ha)	
	Yield	$/t	Yield	$/t	Yield	$/t	Yield	$/t
Bruce	4.0	106	4.3	110	4.9	105	4.8	113
Cadette	3.6	117	3.3	142	4.4	117	3.8	143
Joly	4.2	101	4.5	105	5.5	94	5.8	94
Laurier	4.2	101	4.7	100	5.0	103	5.1	107
Leger	4.1	103	4.6	102	4.9	105	4.8	113
OB621-4	4.5	94	5.1	92	5.2	99	5.1	107

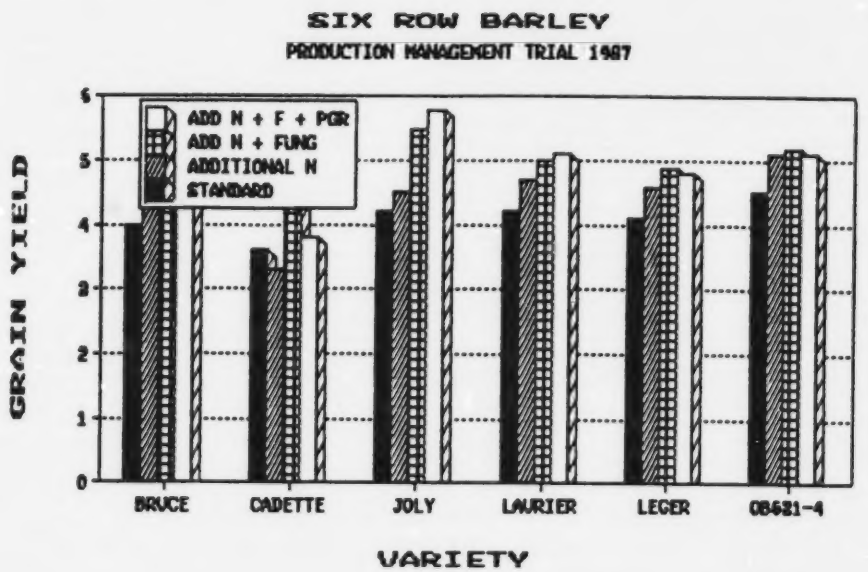
The costs of production for barley will vary with each farm operation, however these general figures give relative economic performances of the inputs.

Generally increased nitrogen fertility did not reduce the cost/tonne of grain used. The addition of foliar disease control lowered the $/tonne of barley equal to or less than the standard management cost. The additional benefit of more tonnes of grain produced is also important. If for example we took the same responses and related this to a farm growing 20 ha of barley:

Variety	Standard			Add N + F		
	Yield	$/t	tonnes/20 ha	Yield	$/t	tonnes/20 ha
Albany	4.1	103	82	5.0	103	100
Joly	4.2	101	84	5.5	94	110
OB621-4	4.5	94	90	5.2	99	104

This increased production at the same dollars/tonne is important when striving for improved on-farm self sufficiency of feed grains.


TWO ROW BARLEY
PRODUCTION MANAGEMENT TRIAL
ADD N + F + PGR
ADD N + FUNG
ADDITIONAL N
STANDARD
GRAIN YIELD
0
1
2
3
4
5
6
ALBANY
AB78-1
AB80-1
BIRKA
KC3884-6
MICMAC
RODEO
VARIETY


SIX ROW BARLEY
PRODUCTION MANAGEMENT TRIAL 1987
ADD N + F + PGR
ADD N + FUNG
ADDITIONAL N
STANDARD
GRAIN YIELD
0
1
2
3
4
5
6
BRUCE
CADETTE
JOLY
LAURIER
LEGER
OB621-4
VARIETY

SPRING WHEAT DISEASE CONTROL

Dwane Mellish, Assistant Director

This trial was initiated primarily to determine the optimum approach to controlling septoria on spring wheat.

A block of spring wheat cv. Max was established on May 4th at a seeding rate of 450 seeds/m^2. Fertilizer (17-17-17) was applied prior to planting at 400 kg/ha. An additional 150 kg/ha of 34-0-0 was applied at ZGS 31. Broadleaf weed control was accomplished by using Target (0.50 kg/ha). Plot size was 2m X 6m. Treatments were arranged in a randomized complete block and replicated four times. Treatments were applied using a 4 nozzle hand held CO_2 sprayer, set at a pressure of 200 K Pa to deliver 300 L/ha. Treatments were applied in various combinations at ZGS 31, 39 and 57. Septoria severity was rated on flag leaf and head. Yields were assessed by harvesting the centre 1.25 m of each plot with a Hege small plot combine.

Extended dry weather conditions during July resulted in abnormally low disease pressure as indicated by disease ratings. Septoria appeared late in grain fill, no Fusarium symptoms were observed.

TREATMENTS	RATE g ai/ha	APPLICATION GROWTH STAGE (Zadoks)	HEAD SEPTORIA (%)	YIELD (T/HA)	KERNEL WT (g/1000)
Control			0.6 a*	5.2 a	43.5 h
Tilt	125	31	0.6 a	5.3 a	43.9 gh
Tilt	125	39	0.5 a	5.6 a	44.6 efgh
Tilt	125	57	0.5 a	5.8 a	46.4 abcde
Tilt/Bravo	125/1000	31	0.8 a	5.3 a	44.3 fgh
Tilt/Bravo	125/1000	39	0.7 a	5.4 a	46.4 abcde
Tilt/Bravo	125/1000	57	0.6 a	5.5 a	47.0 abc
Tilt/Dithane	125/1760	31	0.7 a	5.6 a	45.3 cdefg
Tilt/Dithane	125/1760	39	0.7 a	5.5 a	45.0 defgh
Tilt/Dithane	125/1760	57	0.4 a	5.5 a	45.8 abcdef
Tilt	125	31	0.5 a	5.4 a	46.1 abcdef
Tilt + Tilt/Bravo	125 + 125/1000	31; 57	0.6 a	5.8 a	47.3 ab
Tilt + Tilt/Bravo	125 + 125/1000	31; 57	0.4 a	5.3 a	46.5 abcd
Tilt + Tilt	125 + 125	39; 57	0.5 a	5.6 a	46.7 abcd
Tilt/Bravo + Tilt/Bravo	125/1000 + 125/1000	39; 57	0.4 a	5.4 a	47.4 a
Tilt/Dithane + Tilt/Dithane	125/1760 + 125/1760	39; 57	0.5 a	5.4 a	47.2 ab
Bravo + Bravo	1000 + 1000	39; 57	0.7 a	5.5 a	45.8 abcdef
Dithane + Dithane	1760 + 1760	39; 57	0.7 a	5.6 a	45.5 bcdefg
Folicure	125	31	0.7 a	5.1 a	44.3 fgh
Folicure	125	39	0.6 a	5.7 a	46.0 abcdef
Folicure	125	57	0.7 a	5.4 a	45.8 abcdef
Tilt + Tilt/Bravo/Benelate	125 + 125/1000/250	31, 57	0.5 a	5.6 a	47.0 abc
LSD .05					1.5

* Values in the same column which are followed by the same letter are not significantly different at a 0.5 level of probability. (Duncan's Multiple Range Test)

Low disease pressure conditions gave no statistically significant yield responses. Applications of any fungicide combination in the late growth stages (ZGS 39 & 57) had a significantly positive effect on seed weight. Since disease pressure was non existent in the early season, applications at ZGS 31 did not show any positive effects unless combined with an application at a later growth stage.

In a year where disease pressure is higher a different response might be expected. This trial will be continued in future years to determine the responses under a range of seasonal growing conditions.

SIX ROW BARLEY MANAGEMENT TRIAL II

Dwane Mellish, Assistant Director

A barley management trial was initiated in 1987 to look at a number of short (semi-dwarf) barley varieties compared to Leger. The varieties were grown under four management regimes similar to the standard Production Management Trials.

I Standard	- 70 kg/ha of N at planting
II Additional N	- Management I + 50 kg of N/ha at ZGS 30
III Add N + Fung	- Management II + Tilt @ 125 g ai @ ZGS 45
IV Add N + F + PGR	- Management III + Cerone @ 280 g ai @ ZGS 45

The varieties used on their origin is as follows; Leger (Ottawa Research Station), Duke (University of Saskatchewan), QB198-27 (St. Foye Research Station), C876-20 (Thompson Seeds) and Samson (Alberta Agr.).

All of the semi dwarf varieties were 20-25 cm shorter in height than Leger. Disease pressure was very low due to dry conditions and thus little response was seen from fungicide applications. All varieties except for C876-20, responded positively to additional nitrogen. No lodging occurred and the Cerone reduced plant height by 8 to 15 cm.

Effect of variety averaged over all management levels.

Variety	Ht. (cm)	Blotch Head (%)	1000 k wt (g)	Test Wt. (kg/hL)	Yield (t/ha)
Leger	106 a	0.6	41.1 b	62 a	5.48 ab
Duke	81 b	0.8	38.7 bc	62 a	5.18 b
QB198-27	90 b	0.9	46.9 a	63 a	6.04 a
C876-20	84 b	1.2	40.9 b	59 b	3.48 c
Samson	83 b	0.7	37.5 c	61 ab	5.01 b
LSD	9	0.7	2.8	2	0.57

Effect of management level on yield of varieties.

	Yield (t/ha)			
Variety	Stan	Add N	Add N + Fung	Add N + F + PGR
Leger	5.03	5.61	5.75	5.51
Duke	4.57	5.41	5.50	5.23
QB198-27	5.34	6.13	6.24	6.48
C876-20	3.69	3.40	3.59	3.23
Samson	4.67	5.27	5.13	4.99

The line QB198-27 did very well in this trial as it has done in Regional Variety Trials the last two years. Its high yield potential and shorter straw length are attractive features. This line will possibly be going forward for registration in 1988.

SPRING WHEAT RATE OF SEEDING & ROW SPACING

Dwane Mellish, Assistant Director

As part of an ALFI Technology Transfer Project a rate of seeding and row spacing trial was initiated with the co-operation of Bob Cooper, Great Village. The trial was seeded within a field of MAX spring wheat, using an AMAZONE drill which had adjustable row spacing (8cm and 16 cm). The seeding rate was 300 and 450 seeds/m^2 based on calculations using the 1000 k wt of the seed.

The plots were seeded 3m wide by 10m long with treatments randomized within each of four replications. After seeding, field scale equipment was used to apply a universal fertility and disease control program. Yields were taken by harvesting at 1.25m x 10m strip from each plot with a Hege Plot Combine.

The four treatments were as follows:

Treatment	Row Spacing	Seeds/m^2	kg/ha[1.]
I	8 cm	300	110
II	16 cm	300	110
III	8 cm	450	171
IV	16 cm	450	171

1. Based on seed weight of 38 gm/1000 seeds.

Results were as follows:

Treatment	Plants /m^2	Heads /m^2	1000 Kernel wt.	Test wt (kg/hL)	Yield (t/ha)
I (8/300)	361 bc	911 a	39.5	77	5.21
II (16/300)	312 c	452 c	39.1	77	5.06
III (8/450)	453 a	710 b	37.4	77	5.24
IV (16/450)	419 ab	516 c	37.9	77	5.33
LSD	62	176	ns	ns	ns

The high seed rate established more plants/m^2 irregardless of row spacing. As well, more plants/m^2 were established in the narrow row spacing probably due to a more uniform distribution of seed within the row reducing competition. The narrow row spacing plots had a high tillering rate resulting in a very high number of heads/m^2. There was no significant difference in final grain yield even though there was a great difference in heads/m^2. This could have been due to the dry conditions at grain filling time at which time grain fill was shortened and any differences were masked.

This trial will be continued for two more years to evaluate both row spacing and seeding rate.

SPRING GRAIN SEED TREATMENT TRIAL

Dwane Mellish, Assistant Director

Disease pressure in most years is one of the limiting factors to spring grain yields. Foliar fungicides have been shown to give good control to foliar diseases but they cannot control soil borne diseases. This trial was to evaluate the performance of the most commonly used seed treatment; Vitaflo 280 with experimental seed treatments with the presence of a foliar fungicide program.

Location:	Highland Village	Co-operator:	Gary Brown
Preceding Crop:	Oats	Soil Type:	Sandy Loam
Seeding Date:	April 27, 1987	Harvest Date:	August 15, 1987
Seeding Rate:	400 seeds/m^2	Exp. Design:	Split plot
Plot Size:	1.25m x 6m		
Fertilizer:	Planting 400 kg/ha 17-17-17		
	ZGS 30 150 kg/ha 17-17-17		
Varieties:	Leger, Rodeo and Max		
Seed Treatments:	Vitaflo 280, Baytan, Thiaben dazole, RH3866		

ANOVA Table for Parameters Measured

	Rodeo		Leger		Max	
	Fung.	Seed Treatment	Fung.	Seed Treatment	Fung.	Seed Treatment
Plants/m^2	NS	NS	NS	NS	NS	NS
Heads/m^2	NS	NS	NS	NS	NS	NS
Height	NS	NS	NS	NS	NS	NS
Disease	NS	NS	NS	NS	NS	NS
1000 K.Wt.	**	NS	NS	NS	NS	NS
Test Wt.	NS	NS	NS	NS	NS	NS
Grain Yield	NS	NS	NS	NS	NS	NS

NS - Not Significant ** - Significant at the 5% level

Disease pressure was very low at this location throughout the growing season. A period of dry weather following seeding led to significant moisture stress which reduced tillering and most likely reduced yield potential.

Max

	Plants/m^2		Heads/m^2		1000 k wt (g)		Yield (t/ha)	
	NoF	F	NoF	F	NoF	F	NoF	F
Check	307	287	302	305	37.9	38.6	3.31	3.50
Vitaflo 280	297	336	269	306	38.5	39.1	3.26	3.49
Vita 280 + Baytan	289	317	320	272	38.4	39.8	3.30	3.65
RH3866 + Thiaben dazole	294	296	309	290	37.5	39.3	3.31	3.46
Baytan + Thiaben dazole	341	347	296	305	37.9	40.0	3.51	3.61

Rodeo

	NoF	F	NoF	F	NoF	F	NoF	F
Check	311	316	476	464	44.8	49.5	4.20	4.27
Vitaflo 280	308	330	455	510	46.4	49.2	4.25	4.32
Vita 280 + Baytan	323	291	479	506	48.4	49.0	4.56	4.29
RH3866 + Thiaben dazole	300	305	479	476	47.3	49.2	4.48	4.45
Baytan + Thiaben dazole	332	314	498	435	47.4	49.3	4.50	4.28

Leger

	NoF	F	NoF	F	NoF	F	NoF	F
Check	268	278	285	278	41.0	42.1	5.31	5.42
Vitaflo 280	271	266	270	284	41.7	41.7	5.31	5.35
Vitaflo 280 + Baytan	295	316	282	263	41.5	40.3	5.46	5.50
RH3866 + Thiaben dazole	252	278	279	284	42.1	40.7	5.39	5.45
Baytan + Thiaben dazole	278	296	290	297	40.5	41.0	5.34	5.20

NoF - No Fungicide F - Tilt 125 ai @ ZGS 45

With very low disease pressure the seed treatment had no significant effect on any variable measured. The foliar fungicide improved only the 1000 k wt of the Rodeo.

Had disease pressure been higher, more effects from both the seed treatment and the foliar fungicide would normally be expected.

MISCELLANEOUS GRAIN DEMONSTRATION TRIALS-WESTERN REGION

A.J. Wilson, Soil & Crop Specialist

On farm non replicated grain trials were carried out by a number of co-operators in the Western Region for the purpose of comparing varieties. The results were as follows:

Hulless Oats

Co-operator	Cultivar	Kg/ha	% P	% TDN
Peter Wile	Tibor	1464	15.1	79.5
Don Wilson	Tibor	1394	18.5	75.6
Arnold Hebb	Tibor	1480	19.8	79.8

Barley

Don Wilson	Micmac	2790	11.8	72.2
G. Zillig	Micmac	2029	13.5	78.8
L. Pick	Leger	3217	11.1	73.8
G. Bent & Sons	Leger	4043	12.3	72.3
G. Jackson	Laurier	4293	19.7	74.3

Wheat

Don Wilson	Milton	1823	15	77.7
	Belvedere	2277	13.8	78.1
A. Hebb	Belvedere	1487	19.8	79.8
G. Zillig	Belvedere	1904	11.7	79.5
	Milton	1676	13.5	78.8

Discussion

The spring of 1987 was excellent for planting cereals. As the summer progressed a drought occurred. As a result, early planted short season crops such as barley did better this year than the later season hulless oats and spring wheat. Most years early, shallow planting of recommended varieties is the best insurance to achieve Maximum Yield.

ANNAPOLIS COUNTY CEREAL COMPETITION*

A.J. Wilson, Soil and Crop Specialist

A cereal competition was sponsored for a second year by the Annapolis County Soil & Crop Association. The competition was based on the MEY principal. Any management and cereal crop was allowed. The management that gave the Maximum economic return was declared the winner.

As last year all contestants chose to enter barley. Unlike last year the price of barley had changed from $140.99 to $125.64 f.o.b. Wolfville.

This year the winner received three bags of barley donated by Minas Seed Co-op.

The winning Maximum Economic Yield was achieved by Gordon Jackson (see results).

Competition Results

Co-operator Variety	Kg/ha	Received	Costs	% P	% TDN	Net
G. Jackson Laurier	4293	$539.37	$355.33	10.7	74.8	$184.04
G. Bent & Sons Leger	4043	$507.96	$361.44	12.3	72.3	$146.53
G. Jackson Rodeo (Under-Seeded)	3830	$481.20	$370.85	11	75.7	$110.36
L. Pick Leger	3217	$404.18	$376.13	11.1	73.8	$ 28.06
G. Bent & Sons Rodeo (Intensive Management)	4646	$583.72	$629.81	13.1	75.5	($ 46.08)

Improved management almost always improves yield. The question is "What levels of management should be used to grow grain?"

In order to answer that question several questions have to be answered.

1. What is the price received for grain ($/t)?
2. What are the input costs for two levels of input?
3. What is the on-farm yield expectation from two levels of input?

In order to answer the above questions there has to be an on-farm record keeping system or a system such as "LEAPS".

The following MEY formula can then be used to determinne whether or not to use intensive management:

MEY Formula

(Yield Mgt. B x $/t) - Input Cost B = (Yield Mgt. A x $/t) - Input Cost Mgt A

This formula can be used to determine the yield needed to justify intensive management at a fixed price for grain. Or using a fixed yield the price for grain that will justify using intensive management can be determined.

Using the data from the winning MEY management and management B as example of information that should be determined from long term records, the following can be determined.

1. For a known $/t of 125.64 what yield is needed to justify management B?

(Yield Management B x $125.64) - $629.81 = (4293 x 125.64) - 355.33

Yield Management B = 6.47 t/ha

2. For a known yield of 4.6 t/ha determine the price needed to justify management B?

(4.6 x $/t) - 629.81 = (4.3 x $/t) - 355.33

$/t = 785.63

A price of $785.63/t or a yield of greater than 6.47 t/ha are unrealistic for barley. Therefore one would conclude that in order to justify management B the price of barley would have to increase to pay for the cost of these inputs.

This type of record information is most useful in determining what level of input is justified in a production system.

Annapolis County Grain Competition 1987*

Barley F.O.B. Wolfville 125.64/Tonne

Co-operator: G. Jackson — Management A
Trips

Variety	Kg or L/ha	Received	Costs*	% P	% TDN	Total
Laurier	4293	$539.37		10.7	74.8	$539.37
Seed	134		($62.08)			($62.08)
19-19-19	337		($96.05)			($96.05)
Fert App	1		($15.40)			($15.40)
Spraying	1		($13.20)			($13.20)
Dyvel	1.25		($10.81)			($10.81)
Plow	1		($33.00)			($33.00)
Disk-Level	2		($37.40)			($37.40)
Seeding	1		($15.40)			($15.40)
Lime	4000		($72.00)			($72.00)
		Total Cost	($355.33)	Net Total		$184.04

Co-operator: G. Bent — Management B
Trips

Variety	Kg or L/ha	Received	Costs*	% P	% TDN	Total
Rodeo	4646	$583.72		13.1	75.5	$583.72
Seed	190		($80.75)			($80.75)
Urea	130		($36.01)			($36.01)
Urea	50		($13.85)			($13.85)
17-17-17	200		($54.00)			($54.00)
Fert App	3		($46.20)			($46.20)
Saber	0.78		($14.80)			($14.80)
Tilt	0.25		($21.25)			($21.25)
Cerone	1		($45.00)			($45.00)
Tilt	0.25		($21.25)			($21.25)
Cygon	1		($15.00)			($15.00)
Round-up	1		($24.50)			($24.50)
Plow	1		($33.00)			($33.00)
S-Tine	1		($13.20)			($13.20)
Roll	1		($13.20)			($13.20)
Seeding	1		($15.40)			($15.40)
Lime	5000		($90.00)			($90.00)
Spraying	6		($92.40)			($92.40)
		Total Costs	($629.81)	Net Total		($46.08)

* Results show the difference between managements and do not reflect costs to grow barley.

SOIL AND CROP ASSOCIATION COMPETITIONS WESTERN REGION

Alexander J. Wilson, Soil and Crop Specialist

OBJECTIVE:

It is the objective of the directors of the participating Soil and Crop organizations in the Western Region along with the Agricultural Representatives in the participating counties to improve and promote forage quality in the region thus lessening the on farm requirement for imported feed.

Annapolis County Haylage Competition

Grower	kg/ha	% P	% TDN	$ Total
G. Jackson	9,536	24.5	75.7	2,361
G. Bent	8,913	21.9	71.5	2,015
L. Pick	8,514	17.6	67.5	1,639
B. Van Roestel	8,046	12.9	59.7	1,228
J. Chesley	7,871	14.8	65.8	1,355
T. Den Haan	7.526	14.5	62.5	1.252
A. Bishop	7,338	20.1	65.7	1,520
R. Banks	6,474	24.4	73.9	1,588

1st - 1/2 ton 34-0-0 Fundy Fertilizer

HARVEST DATE

Cut # 1 16/6/87
Cut # 2 30/7/87

Lunenburg Co. Perennial Pasture Competition

Grower	kg/ha	% P	% TDN	$ Total
Faulkenham	12,728	30.3	72.8	3,603
L. Wile	10,299	23.6	70.9	2,434
V. Naugler	9,700	29.3	73.1	2,685
J. Rudolph	9,559	24.8	69.7	2,328
A. Croft	8,281	20.0	67.9	1,731
M. Meisner	8,253	20.8	68.8	1,777
D. Joudrey	6,483	29.7	69.9	1,789
R. Delong	6,193	23.4	68.5	1,440
B. Crouse	5,434	18.4	67.6	1,076
R. Veinot	5,186	24.3	69.9	1,246

HARVEST DATE

Cut # 1 1/6/87
Cut # 2 22/6/87
Cut # 3 14/7/87
Cut # 4 4/8/87
Cut # 5 24/8/87
Cut # 6 21/10/87

Lunenburg Co. Pasture Perennial Competition

1st - 1/2 ton 34-0-0 Scotia-Gold Dalton Jodrey Plumbing and Heating Trophy.
2nd - Bastion Perennial Ryegrass Bridgewater Farmers Co-op.
3rd - $40 Voucher Bridgewater Farmers Co-op.
4th - $20 Voucher Bridgewater Farmers Co-op.

Lunenburg Co. Annual Pasture Competitionn

Grower	kg/ha	% P	% TDN	$ Total
A. Hebb	11,402	31.5	73.6	3,331
P. Wile	7,975	28.6	73.5	2,177
M. Vissers	7,782	22.6	74.2	1,817
B. Mailman	6,436	17.9	70.8	1,276
W. Hebb	6,208	24.7	73.3	1,531

1st - 1/2 ton 34-0-0 Fundy Fert.
2nd - 1 bag Ryegrass Bishop Seeds

Harvest Date

Cut # 1 24/6/87
Cut # 2 15/7/87
Cut # 3 4/8/87
Cut # 4 24/8/87
Cut # 5 21/10/87

Mow Hay Competition Annapolis County - 1st Cut

Grower	Tonne	% P	% TDN	$ Value
J. DeSwart	1	20.5	57.2	200
K. Charlton	1	16.7	49.3	166
E. Bishop	1	13.0	55.5	149
L. Pick	1	12.5	51.8	141
Joi Terra	1	12.6	50.4	140
Greg Cox	1	10.8	57.6	136
B. Van Roestel	1	11.5	51.8	134
R. Ward	1	11.9	49.2	134
D. Den Haan	1	9.9	52.3	124
G. Nobel	1	7.6	51.3	107

Mow Hay Competition - 2nd Cut

L. Pick	1	17.0	69.3	191
Nobel	1	15.5	64.9	176
K. Charlton	1	15.7	60.2	172
J. De Swart	1	16.7	53.4	171
Greg Cox	1	14.5	58.6	162

1st - 1st Cut $50 Scotia Hay Co-op
1st - 2nd Cut $50 Bishop Seed

Lunenburg Co. Mow Hay Competition

Grower	Tonne	% P	% TDN	$ Total	
O. Delong	1	16.5	57.6	174	1/2 tonne 34-0-0 Bridgewater Farmers Co-op.
E. Falkenham	1	12.3	54.7	143	Farol Timothy Bridgewater Farmers Co-op.
A. Croft	1	10.2	53.5	128	$40 Voucher Bridgewater Farmers Co-op.
L. Wile	1	10.3	49.5	124	$20 Voucher Bridgewater Farmers Co-op.

Dollar Value Based on Replacement Cost of Protein and TDN Produced Using:

Corn at $147.8 /tonne and 48% Soy at $408.64 /tonne.

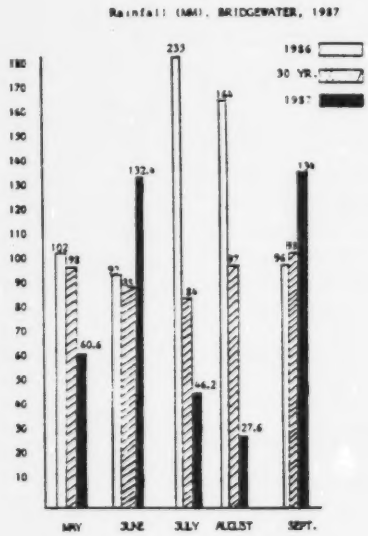
Annapolis County Plowing Competition

1st Edgar Bishop	Overall Plowman	S & C Plaque
1st Danny Finney	2 Furrow Plow	G N Reagh & Sons
1st Edgar Bishop	3 Furrow Plow	J & B Farm Equipment Plaque
1st Chris Thompson	4 & Over	Valley Equipment Plaque

Discussion

In general early cut, well fertilized hay & haylage topped the list in the mow hay and the haylage competition with the legumes and mixed hay doing better than the grasses alone. For yields and value of product produced see tables.

In the annual pasture competition Maris ledger was planted by all of the participants. Early May planting, well fertilized, produced excellent results in spite of the dry season (see figure "Rainfall").



The question has often been asked "What is good quality hay worth?" When you think of a feed stuff as a source of protein or energy then the solution to finding out what it is worth is simplified. In the early 70's I worked out a

simple way of determining the value of quality hay or feed components using two simultaneous equations. The first equation was used to determine the value of protein in that feed and the second equation was used to determine the value of energy. Adding the two values together will give the cost of replacing the protein and energy thus a good indication of the actual value for the feed stuff in question.

To determine the value of protein first determine the cost per tonne of 48% soybean meal landed on farm.

Equation # 1 becomes:

1) $480X + 790*Y = \$tS$

where: X = \$/kg P
Y = \$/Digestible Nutrient
\$tS = \$/t 48% soybean meal
480 = kilos of P/t 48% soymeal
790 = kilos of digestible Nutrients/t of 48% soymeal

There are those who feel that D.E. for ruminants should be used for energy instead of T.D.N. If D.E. is to be used than 790 becomes 3480. If the feed stuff is for a non-ruminant then the D.E. for that animal is used to determine the energy value.

To determine the value of Y or the energy value corn is used:

2) $90X + 790*Y = \$tC$

where: 790* = kgs D.N./t Corn
90 = kgs P/t Corn

Using equation 2 to determine the value of protein (X).

where: \$tC = \$/tonne corn

$$X = \frac{\$tC - 790Y}{90}$$

Using equation 1 to determine the value for a Digestible Nutrient (Y):

$$Y = \frac{(5.33 \times \$tC) - \$tS}{3420.7}$$

Using corn at \$147.80/t and 48% soy meal at \$408.64:

Y = \$.1108352
X = \$.6693355

Substituting these values in equation 1:

\$tS = 480 x .6693355 + 790 x .1108352
\$tS = 408.84

Using this formulae we have come within 20 cents of its actual worth. Close enough.

Using the formulae to determine the value of our winning mow hay with a 20.5% P and 57.2% TDN we see that it would cost $200.61 to replace the protein and energy in that hay.

205X + 572Y= $t hay

205 x .6693352 + 572 x .1108352

$t Hay = $200.61

These formulaes can be used to determine the value of any feed stuff from high moisture ear corn to home grown grain as long as you know the protein and energy content of the feed stuff and the cost of a tonne of corn and 48% soymeal landed on farm.

* Value for digestible energy can be used here.

MAX SPRING WHEAT SURVEY

Eric Bosveld, Soil & Crop Specialist

The market for milling wheat is very valuable in Nova Scotia and therefore the production of consistently high quality wheat is essential to help maintain this market. The timing of the final nitrogen application is one management factor which can significantly affect milling quality or more specifically grain protein level. The recommendation has been to apply 150 kg/ha 34-0-0 at the stage at which the boot just begins to swell. Many growers applied their final nitrogen after some heads had already emerged. In order to correlate other factors (i.e. previous crop, total N, nitrogen form, pH, weather conditions, soil type, etc.) with the timing of the final nitrogen application and the grain protein level, a survey was sent to 56 Max spring wheat growers to obtain information for the summer of 1987.

With total precipitation from May 1 to September 3, 32% below normal in Kentville and 25% below normal in Truro, it can be argued that some of the information obtained from 1987 data may be somewhat atypical. For this reason, only general trends and averages are included in this year's report.

I would like to encourage growers to keep specific crop records on Max for the 1988 growing season. This would allow for the continuation of the survey over several cropping seasons and could be followed with a more detailed report next year.

Results

There were 56 farmers growing Max spring wheat in 1987, 20 of which responded to the survey (36%). This supplied information on 58 Max fields, which received a wide variety of treatments. Below are some of the averages and ranges for the 58 fields.

	Average	Range
pH	6.2	5.3 to 7.0
Yield	3.71 t/ha	2.0 t/ha to 6.1 t/ha
Grain Protein	13.3%	11.5% to 17.0%
Total N	160 kg/ha	100 kg/ha to 230 kg/ha
Final N	51 kg/ha	34 kg/ha to 77 kg/ha

It was interesting to note that 81% of the fields had a grain protein level greater than 12.5% and 50% of the fields were over 13.5% grain protein.

Some of the fields were intended for feed, but of the fields intended for milling purposes, 26% were graded to No. 1 Canadian Eastern Milling Wheat (ICE), 70% were 2CE and only 4% were 3CE.

In order for a crop to make efficient use of applied fertilizer, the pH must be adequate. Of the fields that obtained a grain protein level of 12.5%, 64% of these had a pH greater than 6.0. Of the fields that obtained a grain protein level of above 13.5%, 72% had pH greater than 6.0.

It was surprising to discover that only 16% of the fields received manure. Thirty-three percent of the fields followed a legume in the rotation.

The Timing of the Final N Application

From the information supplied by the growers, there were some obvious discrepancies between the growth stages at which the final N was applied and how many days this was before most heads had emerged. For example, those growers who applied their final nitrogen at ZGS 43 (the stage at which the boot just begins to swell) claimed that this was anywhere from 6 - 12 days before most heads had emerged. In other words, what growers were calling ZGS 43, or what they considered to be the time at which most heads had emerged, were totally inconsistent between farmers and this occurred at all possible growth stages for the final N application.

The discrepancies either lie in the decision as to when the majority of heads had emerged or the actual stage of the crop at the time of the N application. For these reasons, the correlation of the timing of the final N application to grain protein levels was near impossible and no conclusions could be drawn. Clearly, diagrams of the stages should be included with next year's survey to alleviate this problem.

The summer of 1987 was far from typical and since there were the above mentioned discrepancies, the objective of this survey could be only partially achieved. Hopefully, limiting moisture will not be a problem in 1988, and there will be better clarity as to the timing of the final N applications. This would allow for better use of the information obtained.

SCIA CEREAL VARIETY DEMONSTRATION

Eric Bosveld, Soil and Crop Specialist
Dwane Mellish, Assistant Director

Location:	East Skye Glen, Inverness County	Co-operating Farmer:	Herman Van Den Heuvel
		Co-ordinator:	Leo Cox, Ag. Fieldman
		Co-operating Agency:	Inverness SCIA
Soil:	Westbrook Sandy Loam		
Seeding Rate:	145 kg/ha	Seeding Date:	Sept. 10, 1986 (W.W.) 1st week of May (S.B)
Fertility:	Manure plus 200 kg/ha 18-46-0 (in fall for W.W., in spring for S.B.) plus 200 kg/ha 34-0-0 topdressed		
Weed Control:	MCPA @ 1.5 l/ha (only some areas)		
Design:	Unreplicated field size plots		

A cereal variety demonstration was set up in Inverness County to examine the performance of some common Spring Barley (S.B.) and Winter Wheat (W.W.) cultivars under Cape Breton conditions. The winter wheat was grown for feed purposes, and the results are presented below.

Winter Wheat

Cultivar	1000 Kernel Wt. (gms)	Test Wt. (kg/hL)	% TDN (100% DM)	% Protein (100% DM)	% Moisture	Yield 14% m.c (t/ha)
Absolvent	39.1	76.3	79.4	14.1	14.0	2.99
Monopol	40.7	77.5	79.6	12.7	14.0	4.05
Vuka	39.8	68.3	79.1	12.5	17.0	5.60

Poor fall growing conditions resulted in a thin crop at the onset of the vernalization period and subsequently resulted in a crop with open spaces in the spring. Winter survival of all cultivars were quite good due to a good snow cover. Absolvent is normally the hardiest of the winter wheats demonstrated. Vuka and Monopol usually have variable winter survival outside the Annapolis Valley and similar areas.

Only part of the field was sprayed for weeds in the spring, since large areas were weed-free. Late infestations of hempnettle occurred as a result of the thin populations and the absence of weed control in the Vuka, Absolvent and part of the Monopol plots. Vuka is able to compensate for yield under these conditions by the production of very large heads. Absolvent will usually compensate for a thin crop by extensive tillering, although it appeared as though tillering was suppressed by the weed population. Vuka is considered to be later maturing than Monopol and Absolvent as shown by the higher moisture level.

2-Row Spring Barley

Cultivar	1000 Kernel Wt (gms)	Test Wt. (kg/hL)	% TDN (100% DM)	% Protein (100% DM)	% Moisture	Yield 14% m.c (t/ha)
Micmac	40.5	61.3	76.4	11.7	12.0	3.26
Rodeo	39.2	61.3	77.3	11.7	14.0	5.01

The Micmac was lodged slightly more than the Rodeo and had more stem breakage. There was very little net blotch or other diseases present in either cultivar of barley.

This was an effective demonstration, that portrayed cultivar performance under Cape Breton conditions for the summer of 1987, and under one farmer's management. It must be realized that the demonstration was a large plot, unreplicated design, allowing for large variations in yield within plots.

ON FARM BARLEY MANAGEMENT DEMONSTRATIONS

Eric Bosveld, Soil & Crop Specialist
Dwane Mellish, Assistant Director
Jack van Roestel, Senior Crop Extension Specialist

Five farmers from the central region of the Province participated in this year's barley management demonstrations. The objective of this project was to introduce management practices which would assist the farmer in achieving higher yields. Most growers had limited experience with the use of plant growth regulators and fungicides. Regular visits during the entire cropping season gave the crop specialists opportunities to indicate the proper growth stages at which the treatments should be applied, advice on weed control, disease identification etc., as well as any other cropping problems or situations which existed.

The participants had a choice of either four or six treatments including split nitrogen applications, fungicides, growth regulators (although some had a variation of these programs), and were given enough product for the treatment of 2 ha. A booklet was also supplied giving information on the products, diseases and insects, growth stages and how to set up the trial. Appreciation is extended to these companies supplying products.

The plots consisted of adjacent strips or tramlines of each treatment for the length of the fields and were unreplicated. Disease incidence, lodging, plant heights, protein levels, kernel moisture, size and density, and yields were evaluated at each location.

The treatments and their abbreviations are described below;

Standard N = Normal fertilizer applied at planting.

Add N = An additional 150 kg/ha of 34-0-0 applied at ZGS 30/31 (initiation of stem elongation).

Add N + T = Add N treatment plus an application of the fungicide Tilt (0.5 L/ha) at ZGS 39 to ZGS 45 (flag leaf emergence to the swollen boot stage).

Add N + T + C= Add N + T treatment plus the addition of the plant growth regulator Cerone (0.7 L/ha) applied with the fungicide.

Add N + B + C= Same as Add N + T + C, except the fungicide Bayleton (250 g/ha) is substituted for Tilt.

Add N + B = Same as Add N + T but with Bayleton instead of Tilt.

In order for any input to be beneficial, it must pay for itself in increased yield or quality, and it depends on the relative cost of the input and the value of the crop. Therefore the economic impact of each treatment was calculated by taking the value of the additional barley produced (i.e.: the difference in yield between the treatment and Standard N) and subtracting from it the costs of the inputs, using the following values.

$43.50/ha for additional nitrogen (from A.N.)
$40.00/ha for Tilt
$40.00/ha for Bayleton
$36.00/ha for Cerone
$110/tonne for purchased barley

ERNIE FAGE

	Standard N	Add N	Add N + T	Add N + T + C
Disease (flag) (%)	2.4	3.0	0.7	0.5
Plant Height (cm)	109.0	107.7	105.8	94.0
Lodging	Virtually None	Virtually None	Virtually None	Virtually None
Protein (100% DM)	13.1	11.0	12.5	14.5
% Moisture	14.6	14.6	16.2	19.1
Test Wt. (kg/HL)	57.5	62.5	61.3	57.5
1000 Kernel wt. (gms)	36.4	34.8	39.5	37.8
Yield (14% m.c.) (kg/ha)	2791	3086	4010	3169
Economic Impact ($/ha)	0	-11.05	+50.59	-77.92

It is obvious from the disease ratings that net and spot blotch were prevalent in Ernie Fage's Leger barley, even though it was generally a summer of low disease pressure. This was the third year in a row this field had grown barley, indicating the reason for this prevalence. The additional nitrogen increased the incidence of disease and Tilt gave good control. The economics show the value of using a fungicide in combination with additional nitrogen in a situation of high disease pressure.

The relatively short stature of the crop insinuates a possible moisture stress situation. Cerone can sometimes cause yield reductions when applied to a stressed crop and this may have been the situation at Fage's.

STAN MOORE

	Standard	Add N + C	Add N + T	Add N + C + T
Disease (flag) (%)	0.5	0.3	0	Trace
Plant Height (cm)	68.9	64.4	0	66.0
Lodging (0.2 9.0)	0.2	0.2	0.2	0.2
Protein (100% D.M.)	15.5	16.0	17.5	15.6
% Moisture	27.4	19.7	20.9	21.5
Test Wt. (kg/HL)	58.8	66.3	63.8	66.3
1000 Kernel Wt. (gms)	35.9	42.4	42.5	43.6
Yield (kg/ha)	707	1719	1735	2071
Economic Impact ($/ha)	0	+31.82	+29.58	+30.54

Stan Moore had a drought stressed crop of Micmac barley that was seeded late (June 2). He had a significant amount of couch grass which was very effective in competing for moisture, light and nutrients. In addition, the seedbed was too soft at seeding and therefore the seed was placed too deep. This suppresses tillering, which is an especially essential yield component when growing 2-row barley. From the data presented, the addition of 150 kg/ha of 34-0-0 gave large yield increases and economical responses, regardless if combined with fungicides and growth regulars. This suggests that a crop with a low yield potential will be very responsive to the application of additional nitrogen, since neither disease or lodging were major factors.

HUGH BROWNING

	Stan N	Add N	Add N+T	Add N+T+C	Add N+B+C	Add N+B
Disease (head)	0	Trace	Trace	0	0	Trace
Disease (flag)(%)	2.9	0.6	Trace	Trace	Trace	Trace
Plant Height(cm)	115.1	126.4	116.8	93.3	101.5	114.1
Lodging	Lodged	Lodged	Lodged	Not Lodged	Not Lodged	Lodged
Protein (100% DM)	11.9	14.4	14.7	14.0	14.1	14.9
% Moisture	15.4	15.4	15.4	19.1	17.0	15.4
Test Wt. (kg/HL)	61.3	58.8	60.0	60.0	62.5	61.3
1000 Kernel Wt (gms)	34.6	33.0	35.2	39.0	38.8	34.7
Yield (kg/ha)	2113	2251	2415	2877	2781	2063
Economic Impact ($/ha)		-28.32	-50.28	-35.46	-46.02	-89.00

Highest yields were achieved by the use of additional nitrogen, fungicides and plant growth regulators at Hugh Browning's, but the yields obtained were not high enough to pay for the inputs. The Add N + T + C plot yielded over 750 kg/ha more than the standard treatment, but due to the low value of feed barley and the relatively high input costs, this treatment was not economical. Lodging was the main factor affecting yield at Browning's, with all plots lodged except those treated with Cerone. Disease ratings show all fungicide plots as having trace amounts of net and spot blotch, but the Tilt treated plots outyielded the Bayleton plots. It must be remembered that yield variation within a plot may be large and the comparisons are being made between plots which may be on opposite sides of the field, leaving room for large experimental errors. For example, the Add N + B treatment was a considerable distance from the Standard N treatment which may explain the unusual yield reduction.

GRANT BROS.

	Standard N	Add N	Add N + Cerone
Disease (flag) (%)	0.6	0.6	0.2
Plant Height (cm)	87.9	98.8	78.8
Lodging	Not Lodged	Some Lodging	Not Lodged
Protein (100% D.M.)	15.4	16.9	17.5
% Moisture	21.5	16.2	17.8
Test Wt. (kg/HL)	52.5	52.5	54.0
100 Kernel Wt. (gms)	35.5	30.8	32.2
Yield (kg/ha)	2077	2681	2931
Economic Impact ($/ha)		+22.94	+14.44

Grant Bros. received economical responses to applications of nitrogen alone or in combination with Cerone. Lodging was not severe, therefore the most economical treatment was without Cerone, even though the use of the antilodging agent gave an additional 250 kg/ha of barley.

KEITH ANGUS

	Standard N	Add N	Add N + T	Add N + T + C
Disease (flag) (%)	0.2	0.2	0.3	0.3
Plant Height (cm)	123.4	121.9	116.0	96.7
Lodging (0.2 - 9.0)	7.65	7.65	7.65	0.2
Protein (100% DM)	15.5	15.4	15.8	15.9
% Moisture	14.6	15.4	15.4	16.2
Test Wt. (kg/HL)	57.5	58.8	56.3	60
1000 Kernel Wt. (gms)	39.1	42.9	37.3	44.4
Yield (kg/ha) (at 14% m.c.)	5041	5275	5563	6518
Economic Impact ($/ha)	0	-17.76	-26.08	+42.97

Keith Angus set up a high yield potential with Leger barley and then protected it with the use of Tilt and Cerone. From the lodging ratings, it appears that Cerone may have had the biggest impact on yield. Applications of Tilt and additional nitrogen increased yield, but not enough for cost recovery when used alone. Since disease pressure was minimal, a treatment of additional nitrogen and Cerone would have probably been the most economical.

With the very low value of barley in 1987, very large yield increases are needed to recover the cost of improved cereal management inputs. Also since it was a dry summer, disease pressure was low, and therefore yield responses to fungicide application were less than normal. In some cases where moisture was limiting, the straw tended to be short and therefore lodging potential was minimal. It becomes apparent that an integrated approach must be used in respect to economical cereal management. Ernie Fage's site shows the economics of applying a fungicide in a situation of high disease pressure. Keith Angus' site shows the benefits of using an entire package where there is a high potential yield. Additional nitrogen applications have been shown to be beneficial when a crop is suffering. When the value of barley increases, the benefits of ICM will be more pronounced, but for now, each input must be carefully evaluated and integrated into the management scheme when there is a good chance of cost recovery. ICM includes more than fungicides and plant growth regulators. It is important to have the proper seeding depth, seeding date, weed control, etc. to set up a high yield potential before incorporating higher management inputs.

ON-FARM CANOLA PROJECTS 1987

Jack van Roestel, Crops Extension Specialist

Spring Canola has been grown on a commercial scale in Nova Scotia since 1982. It is well adapted to the cool, moist growing season and tolerant of the varied soils of the province. Canola has some potential to be an important cash rotation crop for cereal farmers. Its use in cereal rotations breaks disease cycles and results in improved grain yields.

The canola crop in 1987 was our best ever. The average yield on 82 hectares was 1.74 tonnes/ha. In 1987 the plantings were concentrated in 3 main areas; Kings Co. (34.0 ha), Tatamagouche-Brule (29.2 ha) and the Great Village area (19.2 ha), with 11 growers in total.

The better yields in 1987 can most likely be attributed to improved seeding practices, high Nitrogen fertility used by some producers, and ample heat units. Yields however, were decreased on some fields due to soil moisture shortages from mid June to September, and the substantial yield loss attributed to Reglone coupled with inclement weather or strong winds during the dessication - harvest period.

With our Nova Scotian growing conditions and proper crop management, average provincial yields in the 2.2 - 2.5 t/ha range will soon be achieved. The proper management package should include:

- The use of superior European, Napus type varieties (i.e. Global, Hanna, etc.
- Good initial weed control. Treflan is the most broad-spectrumed herbicide available.
- Mixing a granular insecticide with the seed at planting time.
- Shallow, accurate seed placement. Rolling is necessary to obtain a uniformly emerging, rapidly growing crop.
- Adequate soil fertility which means 100-125 kg/ha of actual Nitrogen, 40-60 kg/ha of Phosphorous or Potash, 1 kg/ha of Boron, and possibly 30 kg/ha of Sulphur.
- Control of white mould (Sclerotinia) disease when initial symptoms appear. Any canola field that has previously had bean or pea crops should be routinely treated with Benlate or Rovral.
- Proper timing and use of a desiccant. Hopefully a superior, alternative treatment to Reglone will soon be registered.
- Harvesting at the proper moisture levels and combine settings.

For more production information on canola consult the Soils and Crops Branch Factsheet, "Spring Canola".

There are currently marketing problems associated with this crop. The long term future of canola in Nova Scotia will be dependent on the feasibility of establishing a local processing facility and market. Both the N.S. Winter Grain Marketing Board and the Provincial Grain Commission are working on this (refer to Canola Update in the A.L.F.I. Project Section of this booklet).

CANOLA PRODUCTION & YIELD TRIALS 1987

NAME	VARIETY	AREA (ha)	DATE SEEDED	SEEDING RATE AND METHOD	FERTILTY PROGRAM (KG/HA)	WEED CONTROL	FUNGICIDE	HARVEST DATE	MOISTURE AT HARVEST	TOTAL CLEAN TONNES	YIELD t/ha
Paul Bartel	Global	13.6	May 30	7 kg/ha Broadcast	17-17-17 @ 330 at seeding 34-0-0 @ 170 G.S.3	None	None	Sept. 16-17	21.0%	19.34	1.42
Gary Brown	Global	4.0	May 18	5.5 kg/ha Drilled (Grass Box)	12-24-24 +.3B @ 250 at seeding 34-0-0 @ 150 G.S.3	Treflan @ 1.8 L/ha	Benlate @ 1.0 kg/ha	Sept. 10	22.0%	5.37	1.34
Peter Clarke	Global	7.6	May 15	7 kg/ha Pneumatic Seeder	17-17-17 + .2B @ 250 at seeding 46-0-0 @ 100 G.S.3	Treflan @ 1.8 L/ha	Benlate @ 0.5 kg/ha	Sept. 1	15.8%	16.07	2.11
Willis Cock	Global	7.6	June 4	7 kg/ha Broadcast	17-17-17 + .3B @ 250 at seeding 34-0-0 @ 200 G.S.3	Treflan @ 1.8 L/ha	None	Sept. 28	18.2%	10.32	1.36
Franklin Isaac	Global	8.0	June 3	9 kg/ha Broadcast	17-17-17 + .3B @ 400 at seeding 34-0-0 @ 200 G.S.3	None	None	Sept. 30	22.0%	12.76	1.60
Lyndhurst Farm	Global	3.2	May 14	7 kg/ha Pneumatic Seeder	16-13-40 @ 500 at seeding 46-0-0 @ 150 G.S.3	Treflan @ 2.0 L/ha	Benlate @ 0.3 kg/ha	Sept. 4	13.5%	8.93	2.79
Tom Meredith Jr.	Global	6.4	May 20	6 kg/ha Drilled	17-17-17 @ 450 at seeding 34-0-0 @ 85 G.S.3	Treflan @ 2.5 L/ha	None	Sept. 13	22.0%	10.55	1.65
Marks Farm	Global	6.0	May 18	7 kg/ha Drilled	Heavy amount of poultry manure	None	None	Aug. 26	16.0%	8.65	1.44
Lester Palmer	Global	7.2	May 15	12 kg/ha Pneumatic Seeder	7-18-36 @ 250 at seeding 34-0-0 @ 100 G.S.3	None	Benlate @ 0.5 kg/ha	Aug. 27	12.8%	10.80	1.50
Frank Webb	Global	8.8	May 11	7 kg/ha Drilled	17-17-17 @ 300 at seeding 34-0-0 @ 200 G.S.3	Treflan @ 1.8 L/ha	Benlate @ 1.0 kg/ha	Sept. 9-11	25.2%	18.38	2.09
Wilmar Acres (Swetnam's)	Global	10.0	May 14	12 kg/ha Pneumatic Seeder	Fall manure and 46-0-0 @ 175 G.S.3	None	Benlate @ 0.5 kg/ha	Sept. 4	12.7%	22.26	2.23
		82.4								143.43	1.74

Eric Bosveld, Soil and Crop Specialist

Maritime soils are considered to be marginally low in available sulfur and therefore crops which require large amounts of sulfur may show deficiency symptoms when this nutrient is limiting. Canola is a crop which is sensitive to low levels of available sulfur, and in Saskatchewan, has proven to be responsive to applications of sulfate fertilizers under certain conditions. The uptake of sulfur by plants is normally in the form of sulfate, which is highly soluable in water, and therefore is subject to leaching. Sandy, well drained soils that are low in organic matter may be the most susceptable soils to sulfur deficiencies. Canola requires both nitrogen and sulfur for protein synthesis and a shortage of either nutrient can inhibit the usefulness of the other. In fact, applications of high rates of nitrogen to sulfur deficient soils tends to intensify the problem.

Sulfur deficiency in Canola results in spindly, stunted growth, with erect, cupped leaves on the top of the plant. The pods are usually short and thin and also stand erect on the stem. Flowering is usually delayed and they tend to be a pale yellow color. In the early growth stages, the underside of the leaves have a reddened appearance and are cupped.

Work in Saskatchewan has shown that soils tested to have less than 22 kg/ha of sulfate (SO_4) usually have favorable yield responses to the addition of sulfate fertilizers, especially if it is a sandy soil. Canola responds less consistently on soils that are tested to have between 22 and 33 kg SO_4/ha and rarely responds to applications when levels are higher than 33 kg SO_4/ha.

To find out if this applied to Nova Scotian conditions, Ammonium Sulfate (24% SO_4) was applied to two Canola fields for general observations. Willis Cock's Canola was on a fine textured, imperfectly drained, Queen's clay loam soil and showed some of the classic signs of sulfur deficiency. Frank Webb's Canola showed no signs of sulfur deficiency, but was on a coarse textured, well drained, Truro sandy loam. Fertilization with nitrogen and sulfur was compared with fertilization of simply nitrogen on the two locations and was unreplicated. Presented below are the details of the treatments and the yields obtained.

Willis Cock

Both treatments had 225 kg/ha 17-17-17 applied at planting (i.e. 38 kg N/ha).

	Treatment 1 Nitrogen/Sulfur Plot	Treatment 2 Nitrogen Plot
Topdressed N at GS 3*	217 kg/ha 34-0-0 i.e. 72 kg N/ha	250 kg/ha 34-0-0 i.e. 85 kg N/ha
Topdressed S at GS 3*	87 kg/ha Ammonium Sulfate (21% N, 24% S) i.e. 18 kg N/ha and 21 kg SO_4/ha	None
Total N	128 kg N/ha	123 kg N/ha
Total S	21 kg SO_4/ha	None
Yield	1978 kg/ha	1637 kg/ha

* GS 3 is the stage at which the Canola starts to elongate (bolt).

Willis' nitrogen/sulfur plot outyielded the nitrogen treated Canola by 341 kg/ha but this is somewhat misleading, since the exact opposite occurred in an adjacent field. It was also split in the same manner, but the nitrogen plot received 10 kg N/ha less than the nitrogen/sulfur treated area (this field was used for the fertilizer spreader calibration) and yielded 541 kg/ha more. Obviously, field variation played a major role, suggesting that sulfur fertilization was not the only variable affecting yield.

Frank Webb

Both treatments had 250 kg 17-17-17 applied at planting (i.e. 43 kg N/ha).

	Treatment 1 Nitrogen/Sulfur Plot	Treatment 2 Nitrogen Plot
Topdressed N at GS 3*	188 kg/ha 34-0-0 i.e. 64 kg N/ha	250 kg/ha 34-0-0 i.e. 85 kg N/ha
Topdressed S at GS 3*	100 kg/ha Ammonium Sulfate (21% N, 24% S) i.e. 21 kg N/ha and 24 kg SO_4/ha	None
Total N	128 kg N/ha	128 kg N/ha
Total S	28 kg SO_4/ha	None
Yield	1979 kg/ha	1146 kg/ha

The yield increase obtained by the inclusion of sulfur in the fertilizer program is again somewhat misleading, since there were significant shattering losses in the areas sampled for yield in the nitrogen plot. This was due to the tractor tracks from the dessication process.

Soil analysis indicated that sulfate levels of both soils were at levels where Canola would have a limited response or would rarely respond under Saskatchewan conditions. (31.9 kg SO_4/ha at Webb's and 38.1 kg SO_4/ha at Cock's). This appears to have held true under our conditions, and it becomes apparent that further investigation should include a replicated small plot design on soils tested to have low levels of available sulfate. This would allow for accurate fertilizer rates and timings, as well as accurate yield sampling and would improve the meanfulness of collected data.

PIONEER CORN HYBRID DEMONSTRATION (H.M.E.C.)

Eric Bosveld, Soil and Crop Specialist

Location:	Onslow	Co-operator:	Bob Fiddes
Previous Crop:	Corn	Co-ordinator:	David Angevine, Clarence's Farm Services
Seeding Date:	May 25, 1987	Seeding Rate:	66700 plants/ha
Planter Type:	John Deere Maxemerge		
Fertility:	Heavy application of liquid dairy manure in fall of 1986 225 kg/ha of DAP (18-46-0) in planter 450 kg/ha of 20-0-20 topdressed		
Lime:	6.7 t/ha applied in fall of 1986		
Soil Texture:	Clay loam		
Weed Control:	6.2 kg a.i./ha Atrazine preplant spot treatment 3 L/ha LADDOK postemergence		
Harvest Date:	October 15, 1987		

	% Moisture	% Stalk Breakage	% TDN	D.M. Yield	Yield Rank
1. Pioneer 3996	47.3	1.3	81.0	7800	2
2. Pioneer 3995	47.7	11.1	83.0	4009	10
3. Hyland LG3	48.6	7.7	80.0	4150	9
4. Funks 4017	48.9	2.7	81.6	9076	1
5. Pioneer 3979	49.7	1.4	83.0	6241	6
6. Dekalb 233	49.8	2.7	80.0	5210	7
7. Pioneer 3969	50.2	1.6	81.0	3450	12
8. Koala	51.0	6.0	79.3	7249	5
9. Co-op 2350	51.4	0	80.5	7395	4
10. Pioneer 3994	52.1	5.1	82.3	3730	11
11. Pride 610	53.0	5.7	80.4	5153	8
12. Funks 4016	53.7	1.3	81.6	7640	3
13. Co-op 2325	54.1	0	80.6	3024	13
14. Dekalb 291	57.0	2.8	80.4	2014	14

As of September 30, 1987, 2536 corn heat units were accumulated in Truro. The High Moisture Ear Corn was planted a bit late, so this may explain the high moistures obtained since all hybrids tested have relatively low accumulated heat requirements.

Some of the observations made, do not necessarily correspond to the moistures presented. It appeared that Koala, Pride 610 and Pioneer 3994, were more mature than Pioneer 3979 and Funks 4017, since they had well formed black layers and hard kernels, although the moisture differences are not that large. The moistures were obtained from two sources indicating data accuracy.

Pioneer 3995, 3996 and 3994 were the first hybrids to tassel, which occurred by July 20th. Four days later the hybrids Pioneer 3969, Koala, Funks 4017 and Dekalb 233 had tasselled.

By August 24th, Koala was the only hybrid that was starting to get doughy. The dry down rates of Funks 4017 and Pioneer 3996 were very rapid. On September 18th, the milk lines of these two hybrids had not moved and by October 2nd, their milk lines were at the bottom of the kernels. This shows that using some of the above observations such as tasselling date, black layer formation, etc. for an indication of maturity does not necessarily result in accurate assessments of relative moisture levels when comparing hybrids of similar CHU requirements.

It must be remembered that this data represents only one unreplicated demonstration, at one location, and therefore the recommended list in publication 100A would be a more reliable source for hybrid selection.

DIGBY CO. SOIL & CROP IMPROVEMENT ASSOCIATION
1987 FIELD CROP TRIAL SUMMARY

Leroy Warner, Project Supervisor
Bruce Gilliatt, Agricultural Representative

In 1987 the Digby Co. S.C.I.A. conducted its' 7th year of project work at the 3.5 ha Hillgrove illustration site which is rented from the Municipality of Digby. The trial objectives again this year, were to demonstrate newer varieties and management practices to local farmers. During 1987 the Association conducted 5 cereal and 1 forage trial. The Association members and Leroy Warner looked after all work activities from plot preparation to harvest.

On September 3rd, a twilight meeting was held at the site. Some 30-40 people turned out which afforded the opportunity for local farmers, seed reps., Crop Fieldmen, and guests to view the plots, discuss cropping experiences and the industry.

1987 Project Observations and Results

The yield results from these plots were generally disappointing. The major reasons for this probably are;

- a later planting (May 18th) which possibly led to inadequate rooting depth and penalized the crop during the dry mid-summer period.
- lack of rainfall and drought stress conditions particularly at the time of kernel fill (grain) and 2nd cut forage regrowth.
- late herbicide application thus allowing the weeds to compete too long for nutrients and moisture. Target is a good broadleaf herbicide for use on cereal crops that should be applied when wild radish (cadlock) and other weeds are in the 2-3 leaf stage.
- insufficient Nitrogen fertility for the spring wheat crop. Refer to footnote in Table 2.

Table 1: Alfalfa-Bromegrass Hay Mixture Demonstration

Varieties:	Apica & Iroquois (Alf), Baylor (Brome)
Date Seeded:	May 6, 1984
1987 Fertilizer:	225 kg/ha of 18-6-18 (April 26th) 225 kg/ha of 18-6-18 (July 23rd)
Harvest Dates:	July 22nd and Sept. 6th
Harvest Yields:	1st cut - 11.6 t/ha of 6.4% Protein, 41% T.D.N. 2nd cut - 2.0 t/ha of 18.1% Protein, 71% T.D.N.

TABLE 2: 1987 DIGBY CO. S.C.I.A. CEREAL TRIALS

Crop and Variety	Plot #	Plot Size (ha)	Seeding Date	Seeding Rate (kg/ha)	Fertilizer* (kg/ha)	Herbicide** (L/ha)	Harvest Date	Protein %	T.D.N. %	Yield (t/ha)
Nova oats	1	0.4	May 18	115	333 of 17-17-17	Target @ 1.5	Sept. 16	12.6	71.8	2.3
Max sp. wheat	2	0.2		135				11.3	79.7	1.0
Belvedere sp. wheat	3	0.4		135			Sept. 18	11.4	79.7	1.5
Kamouraska oats	4	0.4		115				12.9	68.1	1.6
Marion oats	5	0.3		115	Same for all plots	Same for all plots		13.2	71.0	0.8

* This fertilizer rate supplied 57 kg/ha of actual Nitrogen (N) per hectare which is adequate for oats, but not near enough nutrients for a spring wheat crop. Spring wheat requires two further applications of 50 kg N/ha each (150 kg/ha 34-0-0) at Growth Stages Z 30 and Z 45. For more information on growing Max wheat consult N.S.D.A.M.'s "Guidelines for Production of Spring Wheat for Milling Grain".

** For various reasons the herbicide could not be applied until July 8. Excellent weed control was achieved, however by this time the weed competition had greatly reduced plant growth.

HIGH MOISTURE EARCORN HYBRID TRIAL*

Canard, Kings Co., Nova Scotia, 1987

Co-operator: James Borden

Planting Date: May 18, 1987

Planting Rate: 65,000 plants/ha (26,000 plants/ac).

Fertility: 250 kg/ha (225 lbs./ac) of 18-46-0 in planter, plus
450 kg/ha (400 lbs./ac) of 17-17-17 broadcast and harrowed in.

Herbicide: Primextra (6.5 L/ha) applied as an early post-emerge.

Harvest Date: October 28, 1987

Observations: This corn trial was under a prolonged drought stress from mid-June to late August. The lack of moisture along with soil textural differences in the field caused a great deal of variation in maturity and yields. Thus, caution should be taken when analyzing the data or drawing conclusions from this trial.

Hybrid	% T.D.N.**	% Moisture	Wet Yield (t/ha)	Yield *** (t/ha 15.5%)
Speare 102	90.6	35.4	8.5	6.3
DK T778	89.1	36.8	6.8	5.0
Bishop's 30-30	89.9	39.9	7.0	5.0
Bishop's 30-23	89.8	37.3	6.3	4.5
DK 233	90.0	37.2	6.3	4.5
Euros LG 3	90.0	40.2	6.3	4.3
DK 333	90.5	33.6	5.5	4.3
G-4017	87.3	38.0	5.8	4.3
DK 291	88.9	38.1	5.3	3.8
DK 22	89.6	35.4	4.5	3.3
G-4016	91.5	32.8	3.3	2.5
DK 24	90.5	37.7	3.5	2.5
G-4083	86.9	36.1	3.3	2.5

* The trial was conducted by Borden Seeds, Canard. (DeKalb-Bishops-Funks Corn Seed, Dealer for Western N.S.). Yields and tabulation were done by Jack van Roestel, Provincial Crops Extension Fieldman. Each hybrid yield was taken from a sample area of 0.2 ha (0.5 acres).

** Total Digestible Nutrients (T.D.N.) is an indication of the energy content in a forage/feed (T.D.N. % = D.E. 0.04409).

*** Yields have been measured in metric tonnes, with about a 15% cob content by weight in the harvested material. Harvest was done with a 6-row combine with both the chaffer and sieve removed.

TYE NO-TILL SEEDER TRIAL

A.J. Wilson, Soil & Crop Specialist

Introduction

A Tye No-Till seeder was used to plant an Apica alfalfa-basho timothy-ladino clover mix at Churchill Brothers, Yarmouth in 1985.

The same summer at Sweeney Brothers a 90% Prosper clover - 10% Basho timothy was planted using conventional equipment and no cover crop compared to a double pass with the Tye No-Till seeder producing a 4" row spacing, Barley was used as a marker and cover crop. Round-up was used 30 days prior to planting. The field was accidently grazed prior to the boot stage of the barley. As a result no yields were taken in year one.

Two cuts were taken in year 2 with the following results:

Tye No-Till Seeder

Site	Kg/ha	% P	% TDN	$ Total
Sweeney Bros.				
No-Till	12,404	23.5	70.7	2,924
Conv.	12,140	24.5	68.4	2,909
Churchill	11,758	26.1	72.6	3,000

Harvest Date

Cut # 1 15/June/87
Cut # 2 20/Aug./87

Discussion

There were no noticeable or real measurable difference in year two between the conventional tillage with no cover crop and the no-till with a cover crop. In year one the conventional tillage had the greatest amount of weeds but this did not seem to affect yields in year two. I expect that grazing early gave the clover a better chance to compete.

Conclusion

1. A cover crop when cut early, i.e. before the boot stage of the cereal, does not adversely affect establishment. Conversely a cover crop adds to the yield in the first cut and helps to suppress weeds.

2. When using round-up to aid in no-till seeding on a heavy sod it should be used a long time before seeding. Preferably round-up should be applied the fall before the seeding year.

MOWER-CONDITIONER PERFORMANCE ANALYSIS

Finbar Desir, Engineering Dept., NSAC

Co-operators: Jeff Cutten, Lower Truro,
Angus and Arthur Hill, Onslow,
NSAC Farm, Truro

Co-ordinators: Jack van Roestel, Senior Crop Extension Specialist,
Eric Bosveld, Soil and Crop Specialist

Introduction

Grass and legume hay crops must be properly dried after cutting before they can be stored. Drying time is shortened by conditioning (Savoie et al, 1982), which reduces the crop's susceptibility to adverse weather conditions (Shepard et al, 1954), and loss of quality from extended drying periods (Wilkinson, 1981). Conditioning is done by crushing or crimping the stems between rollers, or breaking, crimping or scraping them with flails. The mower-conditioner combines the operations of cutting and conditioning the crop.

In the mower-conditioner unit, the mower may be a cutterbar, disc or flail type, and the conditioner may be one of several types that fall under the roller or flail classifications. Flail conditioners are generally considered suitable for grasses, but rather aggressive for legume crops, which are usually handled with roller conditioners. In recent years, modifications of flail and roller types have been introduced into the region by several manufacturers, with claims of more gentle, yet more effective conditioning action on both grasses and legumes.

Objectives

This project had the following objectives:

1. To assess the effects of five mower-conditioners on the drying time of grass and legume crops.
2. To assess the amount of crop loss from the operation of the five mower-conditioners in the grass and legume crops.

Experimental Procedure

Five mower-conditioners and one mower (six machines) were tested in three fields; red clover, reed canary and alfalfa. Following are the machines used:

A. KUHN FC 250, disc mower, comb type flail conditioner, operating width 2.5 meters.
B. JOHN DEERE 1326, tine type impeller flail conditioner, operating width 2.4 meters.
C. KIDD CLIPPER 240, drum mower, nylon intermeshing twin rotor brush conditioner, operating width 2.4 meters.
D. HESSTON 1040, disc mower, crimping (rubber vane) roller conditioner, operating width 2.3 meters.
E. VICON KM 281, disc mower, crimping intermeshing roller conditioner, operating width 2.8 meters.
F. KRONE AM 241 disc mower (control), operating width 2.4 meters.

The experiments were done on second cuts of a red clover field in Onslow (Messrs. Arthur and Angus Hill), July 24-26, 1987; a reed canary field in Old Barns (Mr. Jeff Cutten), July 27-28, 1987; and an alfalfa field on the NSAC farm in Truro, July 29-30, 1987. The red clover experiments had to be abandoned because of rain. The other two crops served to represent both grass (the reed canary) and legume (the alfalfa) crops.

A test area of approximately 1.5 hectares in each field was divided into four equal replicates or blocks. The six machines were then operated in a random sequence in each block, to give six runs per block (Fig. 1). At two random locations along each run, a full width sample of the windrow 1.5 meters long was placed onto a tray, in such a way that its physical condition was as similar to that of the windrow as possible. The trays were 1.5 meters square, made of 25 mm wire mesh on a wooden frame 76 mm high.

At two other locations along each run, a section of the windrow was carefully lifted away, and all loose crops within a 1.0 meter square frame placed on the ground was collected for crop loss determination. Samples were also taken from the standing crop for yield measurements.

As soon as a sample was placed on a tray, crop samples were taken for initial moisture content determination, and the tray was tagged and weighed. All trays were moved to a common location in the field so that the samples would have similar drying conditions.

Trays were re-weighed at four-hour intervals till dusk on the day of cutting, and through the next days until the crop was dry enough for baling (about 35%-40% moisture content). After the last weighing, crop samples were taken from each tray for final moisture content determination.

The data obtained from the sample weight and moisture content measurements were computed and analyzed by statistical analysis of variance method. Duncan's New Multiple Range Test was used to test for differences between machines.

Results and Discussion

In both the reed canary and alfalfa fields, the crops dried to a moisture content of about 30% (wet basis) within 40 hours of cutting. For each sample the time (in hours) required for crop moisture content to drop to 35% (wet basis) was computed. This represented the drying time for this sample. When these times were analyzed, it was found that there was little statistical difference between the drying times obtained from different mower-conditioners.

Drying rates for all samples were plotted as graphs of moisture content against time. Average drying rates for all machines in the alfalfa field are illustrated in Figure 2. This graph shows that all machines attained 35% moisture content with only two hours difference between the fastest and the slowest, in the following order: Kuhn, John Deere/Vicon, Krone, Hesston, and Kidd. Similar information for the reed canary field is illustrated in Figure 3. Only in this field was the mower significantly slower than the mower-conditioners. Again there was a two-hour gap between the fastest and slowest mower-conditioner, in the following order: Kidd, Kuhn, John Deere, Vicon and Hesston.

Crop loss in the reed canary field was found to be negligible for all machines. Average losses in the alfalfa field are presented in percent of crop yield for each machine in Table 1 and Figure 4. The highest loss was 4.98% for the Kuhn mower-conditioner, and the lowest, 0.48% for the Krone mower.

FIGURE 1: Field Layout - ALFALFA Field, NSAC Farm

Machines:

A	KUHN	D	HESSTON
B	JOHN DEERE	E	VICON
C	KIDD	F	KRONE

E	A	C	B	D	F	B	F	D	C	A	E
F	C	E	A	D	B	D	F	B	A	E	C

TABLE 1: Average Crop Loss as Percentage of Yield

A	KUHN	4.98 %
B	JOHN DEERE	4.53 %
C	KIDD	3.38 %
D	HESSTON	3.05 %
E	VICON	1.09 %
F	KRONE	0.48 %

Figure 2

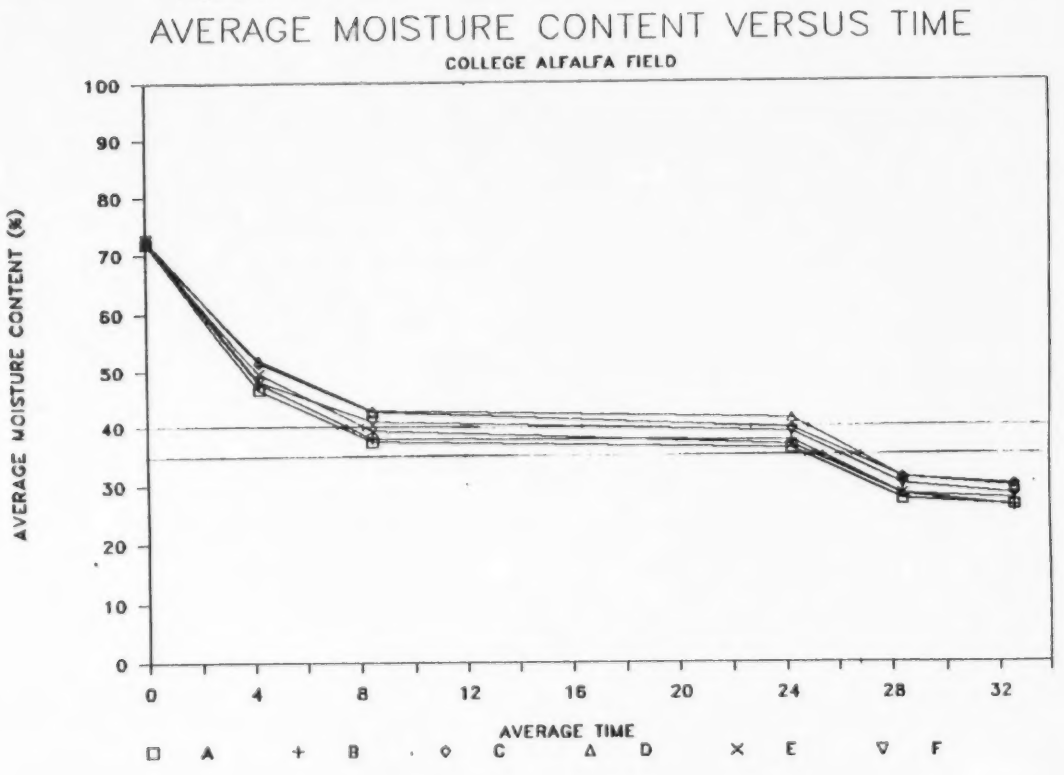


Figure 3

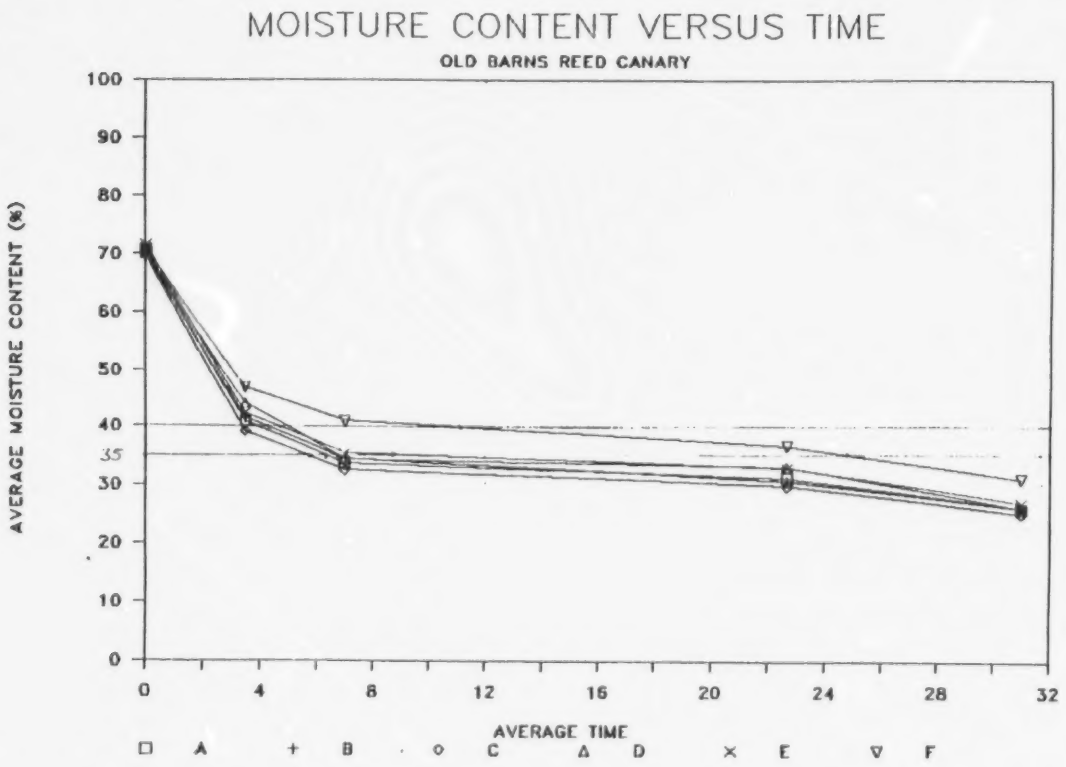
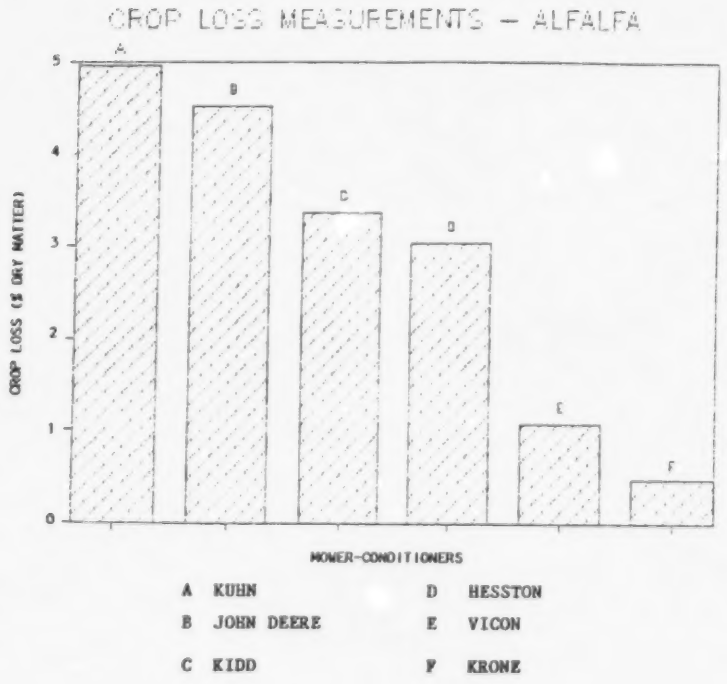


Figure 4



NEWLY INITIATED A.L.F.I. TECHNOLOGY TRANSFER PROJECTS

Jack van Roestel, Crops Extension Specialist

In March 1987, the beginning of the Canada/Nova Scotia Agreement on a Livestock Feed Initiative (A.L.F.I.) took place.

The Technology Transfer sub-program is a key part of A.L.F.I. Its objective is "to accelerate the rate of adoption of new technologies thereby increasing the quality and quantity of local feed production and improving the net income of producers through reduced per unit costs of production. The main features of the Tech. Transfer Program include the introduction, testing, demonstration, use and economic assessment of technologies for adaptability to local conditions, or replication across the province to demonstrate suitability of the technologies".

During 1987, there were 32 Tech. Transfer Projects approved (as of Dec. 31) of which I am involved with 7 of these "on farm" evaluations either as a project leader or advisor. Since these projects are in their initial study year it is not appropriate to report on them in detail or draw any conclusions, however a brief summary will be given to bring S.C.I.A. members up to date.

Evaluation of Various Perennial Pasture Mixtures

This is a 3 year study on Tyler and Lorraine Fisher's dairy farm in Nappan, Cumberland County. The main objectives are to demonstrate the value of good pasture management practices and to evaluate the performance/ persistence of three relatively "new" perennial mixtures versus the commonly recommended orchardgrass/ladino clover mixture for sandier soils.

The following mixtures were seeded on May 12th on approximately 1.5 ha grazing blocks.

1) Bastion Perennial Ryegrass (18 kg/ha) plus Ladino Clover (2 kg/ha).
2) Johnstone Fescue Hybrid (14 kg/ha) plus Frode Orchardgrass (6 kg/ha) and Ladino Clover (2 kg/ha).
3) Trader Meadow Fescue (14 kg/ha) plus Farol Timothy (6 kg/ha) and Ladino Clover (2 kg/ha).
4) Frode Orchardgrass (10 kg/ha) plus Ladino Clover (2 kg/ha).

During the next two years the pasture productivity (yields, quality analysis and Animal Grazing Days) along with the cost/return of each mixture will be monitored.

Evaluation of Annual Ryegrass for Haylage and the Ecosyl Fermentation Additive

The study is being done on Gerald Robinson's farm, near Shubenacadie. The main goals are to conduct a comprehensive analysis of using a Westerwolds annual ryegrass as a high energy, stored feed alternative to corn silage and perennial clover forages on heavy clay loam soils.

Secondly, to determine the cost effectiveness of the Ecosyl fermentation additive on improving the ensiling of "long chop" annual ryegrass and red clover/grass haylage.

During the summer of 1987 there were 24 ha of Westerwolds annual ryegrass grown, harvested and stored in piles with the European haylage system. The haylage piles contained;

#1 - 1st cut red clover/grass (approx. 100 t of D.M.)
#2 - 1st cut annual ryegrass (approx. 50 t of D.M.)
#3 - 2nd and 3rd cut annual ryegrass plus small amount of 2nd cut clover/grass (approx. 100 t of D.M.)
#4 - 4th cut annual ryegrass treated with formic acid (approx. 40t of D.M.)

The yield results with either crop, annual ryegrass (7.5 t of D.M./ha) and perennial forage (<5 t of D.M./ha) were not impressive due to lack of soil moisture caused by the prolonged dry spell from late June - September. With a good growing season annual ryegrass should produce 10-14 tonnes/ha.

To test the Ecosyl fermentation additive, approximately half of the total tonneage (except pile #2) of both the ryegrass and perennial forage was treated. This was done by not treating the bottom 2 ft. of each pile, then laying down a plastic separation sheet, and treating the top 2 ft. of the pile with the Ecosyl - pickup wagon mounted applicator.

A feeding study will be conducted during the winter stabling period. Two groups of 20 Holstein cows each (10 high producers and 10 lows) will receive either treated or untreated haylage. Detailed recording of forage quality, haylage intake, milk production and butterfut, plus a comprehensive economic analysis of the ryegrass vs. perennial forage and the Ecosyl vs. untreated haylage will be conducted.

Demonstration of a Vredo No-Till Seeder for Forage Establishment

This evaluation is being carried out by Herman Mentink and a group of Grand Pre - Gaspereau area farmers. The purpose is to assess whether this type of no-till drill and seeding approach can produce good forage stand establishments. Numerous grass and legume species will be planted with this drill over the next few years on various soils, ranging from sandy textured upland to fine textured dykelands.

The Vredo Seeder is very popular in Holland for rejuvenating perennial ryegrass stands that are winter killed or declining in productivity. It will be interesting to watch how this rugged, double disc opener drill does in our Nova Scotian conditions, particularly in cases of heavy sod covered fields, stoniness, no chemical weed suppression, etc.

Investigation of Forage Systems in Holland-England-Scotland

In September 1987 a few Central region farmers and an extension worker were granted an A.L.F.I. travel request to view overseas forage systems. The group was interested in examining different forage management and haylage handling systems that could be modified or adopted onto Nova Scotian farms. The participants were John Davison, Alex Forbes, John MacGregor and Yvonne Thyssen-Post, the Ass't Agr. Rep. for Colchester County. I had the good fortune of being asked to accompany the group as a "technical advisor".

The main objectives of the investigational travel were:

1. to observe how farmers in Holland, England and Scotland were making haylage (i.e. species management, harvest machinery, silage pile making technique and feeding equipment),
2. to gain insight into the use and effectiveness of acid preservatives/ bacterial inoculants for "improving" fermentation, and lastly,
3. to develop an understanding for the role of forage in the dairy industries of these three countries.

Personally, I found the 12-day visit to these three countries very productive and informative. The trip was productive from a sense of developing an understanding of the countries' forage/dairy industries, making good extension and research contacts. It was informative because of seeing first hand, their various haylage/silage systems and picking up technical pointers. Here are a few general forage industry conclusions from the investigational travel;

Holland

1. Primary forage species are English perennial ryegrasses, however some Italian ryegrasses are grown on the Polders area in particular, and there is 190,000 ha of silage corn in Southern Holland,
2. Intensive management and high $ inputs go into producing quality haylage. This includes high Nitrogen fertility, multiple and early cutting, plus quick wilting to 35% Dry Matter or an additive is used,
3. Heavy reliance on custom contractors is common in this country (e.g. ditch cleaning, tillage, seeding and harvesting). Contractors use precision chop, self propelled units or long chop, pickup wagons and,
4. Most haylage is stored in horizontal piles, corn silage is however put in low walled bunkers. Block cutters and busters are common feeding equipment.

England-Scotland

1. Very difficult climate to wilt grass, usually only 15-20% Dry Matter in their silages. Formic and sulfuric acid additives commonly used,
2. Bagged and wrapped round-bale silage is currently popular. Most silage however, is stored in high bunker silos. Effluent or run-off is a serious problem in many instances,
3. Forage species are primarily perennial ryegrasses, but there is renewed interest in clover mixtures with increasing Nitrogen costs and groundwater problems,
4. British dairymen are very conscious of input costs and net returns. Many are thus feeding less than 1.5 tonne of concentrate/lactation, by-product feeds (beet pulp) and wet, high energy grass silage.

Hopefully this overview of the trip will inspire many of you to read either the groups' or my own technical report. Either of which is easy reading, that will take about an hour of your time and provide some good information on forage systems in these countries.

Utilization of a Conventional Computerized Feeding System to Feed High Moisture Corn Cob Meal* to Dairy Cows

This project has just begun in January 1988 and should provide some useful findings into the possibilities of feeding high moisture corn cob meal (C.C.M.) through a conventional computerized feeding station. Courthouse Hill Farm (the Blois family) in Gore, Hants Co. will carry out the evaluation.

During the past few years the Blois' have been feeding high moisture C.C.M. that was grown in the Valley, trucked to their farm, ground and ensiled in a bunker silo. Upon utilization, the corn cob meal was taken with a uni-loader and dumped on top of haylage in the feed bunk, thus offered free choice to the cows. Consequently because the cows cannot be grouped in their free stall barn, the lower producers (<15 kg milk/day) were getting too much of this high energy material.

The project is proposing to do away with bunk corn feeding and unload it into a short solid bottom elevator, which will in turn fill a 1.85 m (6 ft.) diameter poly bin located in the free stall area. The bin has 750 kg capacity and is equipped with a motorized agitator in the base. Corn cob meal is moved a short distance from the bin by a 10 cm. diameter (4 in.) auger along the ceiling and gravity falls into 10 kg hoppers above each of the 5 feeding stations. These 10 kg hoppers are retro-filled to facilitate a ready supply of corn for each cow (36% protein concentrate is also fed through the station). The high producing cow (<20 kg milk/day) steps into the station stall and receives her corn allotment from the transponder activated-computerized feeding system.

The performance of this feeding approach will be watched closely by measuring the consistency of flow and calibration of feeders, moisture/temperature checks of the corn in the bins, plus visual appraisal of any problems associated with augering this high moisture corn cob meal.

If this corn delivery system is successful then it will provide other diarymen in similar situations to the Blois', a method of completely mechanized and regulated C.C.M. feeding in free stall barns (where grouping is not possible). This in turn may create a more constant market for high moisture corn that is grown in the Valley as a reasonably priced, energy concentrate for dairy cows.

* Corn cob meal is harvested at 28-40% moisture with 4 to 6-row combine that has both the chaffer and sieve removed. This harvest method provides a very clean kernel and cob product, (no husks or leaf trash, with 15% cob content by weight) compared to corn taken with a snapper head-forage harvester.

Canola Production Technology Transfer Project

The canola project was initiated by the N.S. Winter Grain Marketing Board and involved 11 growers in 1987. The primary objective of this project is to increase the tonneages of high quality canola in Nova Scotia, by applying good crop management practices and allowing a return to producers equaling the cost of production entailed in these practices.

Briefly stated, canola is an oilseed that has some potential as a cash crop alternate to milling wheat (both as a livestock feed protein and fat source), plus it's an excellent disease cycle-break crop for cereals, well suited to our Maritime climate, and can be grown with standard grain equipment.

The project will be 3 years in duration and provide those involved with the opportunity to gain experience and "fine tune" the canola production recipe so that provincial yield averages will be up in the 2.2 - 2.5 t/ha range.

For a summary of this year's management practices and yields, please refer to the report "On-Farm Canola Project 1987" also in this booklet.

As alluded to in the objective, there are A.L.F.I. funds in reserve if necessary, to act as a "Deficiency Protection Payment Plan" should the market price take a turn for the worse again, as was the case in 1986. This will guarantee the participating growers - break even return on investments during the short term life of the project, while the future fate of canola can be determined.

What is the future for canola in Nova Scotia? It depends on the feasibility of a provincially established processor (low cost, extruder type), the local feed industries commitment to using canola as a protein and fat source in rations, and the potential net dollar return/ha for this crop.

The Feasibility Study sanctioned in 1987 by the Grains Commission, plus the A.L.F.I. Canola Production Transfer Project will answer this overall question within the next two years.

Drainage Performance of Various Tile Spacings on a Shallow, Slowly Permeable Nova Scotia Soil

Also in 1987, a Departmental committee was formed to provide an organized approach to Soil Drainage Research in this province. The committee is comprised of Soil Specialists, Drainage Engineers and a Crop Fieldmen.

This group has a good appreciation for drainage problems in Nova Scotia and will be instigating research projects to provide some long term solutions.

In the fall of this year the first of these studies began on a 10 ha field on Stan Moore's farm in Victoria, Cumberland County. This is a five year project that will look at the drainage performance of various spacings of conventional sized tile on a slowly permeable clay loam soil. The spacings are 3, 6 and 12 metres (10, 20 and 40 ft.).

Over the duration of the project various soil parameters will be measured, along with forage and grain yields and ultimately the net dollar return from each treatment (i.e. optimum tile spacing) will be determined.

The following is a quote from the research proposal that will expand on our drainage problems and this project's objectives;

"One of the problems associated with agricultural drainage in Nova Scotia is the very low saturated hydraulic conductivity, particularly for the compact till soils, such as the Queens soil, which requires that drains be spaced so close that their economic feasibility becomes questionable. The situation is further aggravated because the average annual precipitation, based on 30-years of data, is 1260 mm and only 525 mm of this is lost due to evapotranspiration. This causes excessively high water tables during the spring and some periods of the growing season. The high water table may create excess soil moisture which interferes with crop growth and the timely performance of tillage, seeding and harvesting operations.

The objectives of this research are:

1. To evaluate the performance of a subsurface drainage system on shallow slowly permeable compact till soil types. The performance is based on a water table drawdown at the midpoint between drains and on the outflow measurements following a heavy rain that saturates soil above the drains.

2. To compare the results obtained from this research with those of the standard drainage theories, to determine their applicability to drainage design in slowly permeable compact till soils."

The Soil Drainage Research Committee should be a positive force in supplying future land drainage strategies for problem Nova Scotia soils. The Cumberland County project discussed in this report is hopefully just the beginning of research efforts. Other projects being considered may evaluate shallow - small diameter tile, use of gravel infill with tile, tile-deep ripping combinations, improved land forming and ditching technique, etc.

This concludes the summary of A.L.F.I. projects that I've become involved with this year. Consult future project booklets for updates and results of any of these studies.

SMALL DIAMETER, CLOSE SPACED TILE DRAINAGE EVALUATION

Eric Bosveld, Soil and Crop Specialist
Bob Cooper, Co-operating Farmer

This is the 1987 report of the A.F.D.A. Technology Acceleration Project at Bob Cooper's in Great Village, Colchester County. In 1984 this project was initiated to access the value of using small bore, closely spaced tiles to drain some of the problem soils of the region. Soils with poor internal drainage and dense subsoils (Queens and Debert series) are drained more effectively when the tiles are closely spaced, as shown by data from this project over the past three years. The objective of this project in 1987 was to confirm the above observation and to relate this to improved crop productivity.

The treatments were as follows:

(1) 35mm diameter tile @ 3 meter spacing
(2) 60mm diameter tile @ 6 meter spacing
(3) Conventional 100mm diameter tile @ 12 meter spacing
(4) A check plot with no tile drainage

All three of the tiled plots had single outlets and were equipped with devices to measure the water outflow for each plot on a continuous basis. Dr. J. Burney of the Technical University of Nova Scotia devised an equation to convert the raw data into litres of water outflow per unit of time.

The following table shows the crop yield results for the last three years;

Treatment	1985 Barley (t/ha)	1986 Canola (t/ha)	1987 Spring Wheat (t/ha)
(1) 35mm @ 3m	2.5	1.7	4.9
(2) 60mm @ 6m	1.8	2.1	4.5
(3) 100mm @ 12m	1.6	1.0	4.8
(4) Check	1.9	1.6	4.6

For the third year in a row, the yield data is inconclusive. In 1985, there was substantial head loss of the barley due to a delay in harvest and in 1986, variable amounts of sclerotinia stem rot between plots affected the yield of the Canola. In 1987 all plots of the spring wheat were severely lodged, but the degree of crop loss between treatments was not measured. General observations made by Mr. Cooper were that the check and the conventionally tiled plots limited the date of seeding. He felt he could have seeded the spring wheat approximately 4 days earlier, had all the plots been as well drained as the 35mm tile @ the 3 meter spacing area. Since early seeding is an important component in establishing a high yield of small grains, theoretically higher yields may have been possible if each plot had been seeded as early as trafficability allowed. Also since the spring of 1987 was relatively dry, this difference in trafficability may have been more pronounced in a normal year. Mr. Cooper also noticed that the small diameter, closely spaced tile drained plot was drier in the fall after significant amounts of rain.

Unfortunately, due to computer analysis problems, no water outflow data for 1987 can be presented in this report. This will be included in next year's report.

TANSY RAGWORT CONTROL IN GRASS PASTURES

Eric Bosveld, Soil and Crop Specialist
Donald L. MacDonald, P.Ag., Agricultural Representative

Location:	Cloverville, Antigonish Co.	Co-operating Agency:	Antigonish SCIA
Design:	Unreplicated	Co-operating Farmer:	Jim MacNeil
Plot Size:	1.2 ha	Water Volume:	150 l/ha
Spray Pressure:	50 psi	Spray Date:	September 18, 1987

Tansy Ragwort (Senecio jacobaca) is a serious poisonous weed, common to many pastures in Eastern Nova Scotia. It is a biennial plant but under certain conditions, it can be a perennial. Normally, the plant germinates in the fall or spring and forms a rosette. It flowers, goes to seed and dies the following year. If the plant is cut, regrowth and blossoming can occur in the third year. Each plant can produce up to 150 thousand seeds, each of which can be viable up to at least four years.

All the plant parts of Tansy Ragwort are poisonous, containing six different alkaloids which accumulate in the liver and cause liver damage. Normally mature plants are avoided by grazing livestock but the small rosettes intermixed with the desirable forage often are accidently eaten. It is consumed readily when contaminated hay is fed.

The magnitude and severity of this weed led to the following demonstration trial.

Treatments

1. Check (no spray)
2. 2,4-D ester @ 2.25 kg a.i./ha (i.e. 2,4-D ester (660 g/l) @ 3.4 l/ha)
3. 2,4-D amine @ 2.25 kg a.i./ha (i.e. 2,4-D amine (500 g/l) @ 4.5 l/ha)
4. Dicamba @ 1.1 kg a.i./ha (i.e. Banvel (400 g/l) @ 2.8 l/ha)

Approximately two weeks after the treatments were applied, there appeared to be very little herbicidal effect on the Tansy Ragwort, although the 2,4-D ester appeared to give reasonably good control of yarrow, chickweed, buttercup, and broadleaved plantain, whereas the 2,4-D amine had very little affect on these weeds. Dicamba gave good control of chickweed but had very little affect on broadleaved plantain and yarrow. None of the treatments had any visible affect on the wild white clover present in the pasture.

Three weeks after the pasture was sprayed, seven random square meter counts of Tansy Ragwort were made per treatment. The total number of rosettes, the number of rosettes entirely controlled and the number of rosettes exhibiting visible herbicidal damage, were recorded with the following results;

Treatment	% Killed	% Injured
1. Check	0	0
2. 2,4-D Ester	32	51
3. 2,4-D Amine	0	30
4. Dicamba	29	50

The following week (one month after spraying), the parameters were measured again with the following results;

Treatment	% Killed	% Injured
1. Check	0	0
2. 2,4-D Ester	30	35
3. 2,4-D Amine	0	25
4. Dicamba	27	33

The results suggest the possibility that some of the injured plants recovered from the herbicide treatments.

Work on Tansy Ragwort in New Brunswick has produced similar levels of control in some cases, but sometimes much better results were obtained with the same herbicides and rates used in this demonstration.

Doug Doohan, Supervisor Weed Science Services, suggested that the summer drought may have reduced the plants ability to absorb the herbicides, resulting in poor control.

It becomes apparent that an integrated approach must be used to control heavy infestations of this weed. High fertility, the use of aggressive forage species, grazing management, biological control, in conjunction with successive herbicide treatments may be required. Hopefully this project will continue next year and more positive results will be achieved by including some of these other methods of control.

PREPLANT CONTROL OF SMOOTH BEDSTRAW

Eric Bosveld, Soil and Crop Specialist

Location:	Ohio, Antigonish Co.	Co-operating Farmer:	Mike Chisholm
		Co-operating Agency:	Antigonish SCIA
Design:	Unreplicated Field Size		
Spray Date:	September 3, 1987	Spray Pressure:	34 PSI
Water Volume:	88 L/ha		

Smooth Bedstraw (Gallium mollugo L.) is a perennial weed that can choke out productive forage species in hay field and pastures. It reproduces by seed and by producing underground rhizomes giving it the ability to quickly spread over nearby vegetation. It is considered to be a very serious weed in New Brunswick and has been reported in various areas in Nova Scotia. Therefore a demonstration trial was set up to examine some control measures under local conditions.

Two rates of glyphosate (Roundup) were sprayed on an alfalfa field in Ohio that will be reseeded in the spring. Eight square meter evaluations were made three weeks after treatment with the results summed up as follows;

1. Roundup at 1.8 L/ha
   84% control

2. Roundup at 3.6 L/ha
   82% control

The control levels appear to be quite high with both rates of glyphosate, which is somewhat misleading. The top parts of the plants were dead but vigorous new shoots were produced after the herbicide application. Apical dominance was probably suppressed which promoted rhizome bud development. Very few plants were entirely dead, indicating the possibility of proliferation in the spring. Also, many of the plants had already flowered and gone to seed, providing a source for new infestation. Evaluations will be made in the spring and appropriate measures will be taken.